

# AppleShare IP

The Comprehensive Guide  
to Using Apple's New  
Networking System  
*in the real world.*

Tom Dell



CD-ROM ENCLOSED



**AppleShare**  
**IP**



# AppleShare IP

Tom Dell



AP PROFESSIONAL

*AP PROFESSIONAL is a division of Academic Press*

Boston San Diego New York  
London Sydney Tokyo Toronto





**AP PROFESSIONAL**

*An imprint of ACADEMIC PRESS*

*A division of HARCOURT BRACE & COMPANY*

Find us on the Web! <http://www.apnet.com>

This book is printed on acid-free paper. ∞

Copyright © 1998 by Academic Press.

All rights reserved.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.

All brand names and product names mentioned in this book are trademarks or registered trademarks of their respective companies.

Academic Press

525 B Street, Suite 1900, San Diego, CA 92101-4495

1300 Boylston Street, Chestnut Hill, MA 02167

*United Kingdom Edition published by*

ACADEMIC PRESS LIMITED

24-28 Oval Road, London NW1 7DX

#### **Library of Congress Cataloging-in-Publication Data**

Dell, Thomas.

AppleShare IP / Thomas Dell.

p. cm.

Includes index.

ISBN 0-12-208866-2 (alk. paper). -- ISBN 0-12-208867-0 (CD-ROM)

1. Web servers--Computer programs. 2. AppleShare IP. I. Title.

TK5105.888.D46 1998

005.7'13769--dc21

97-31939

CIP

Printed in the United States of America

97 98 99 00 CP 9 8 7 6 5 4 3 2 1

***Dedication***

*Dorian J. Cougias*

*Thank you for all your support through the years.*



# Contents

## **Introduction .....xi**

Acknowledgments..... xii

## **Chapter 1:**

### **The Evolution of AppleShare ..... 1**

AppleShare 1.x and 2.x .....2

AppleShare 3.x.....2

AppleShare 4.x.....4

AppleShare Pro .....7

AppleShare IP .....8

Summary .....9

## **Chapter 2:**

### **The Macintosh Server ..... 11**

Apple Workgroup Servers .....13

Summary .....22

## **Chapter 3:**

### **Installing the Macintosh Server ..... 23**

Backing up the Hard Drive .....24

Installing Additional Hardware.....33

Finding a Place for Your Server .....	44
Connecting the Server to the Network .....	48
Installing AppleShare IP .....	52
Special Circumstances .....	67
Summary .....	77

## **Chapter 4:**

### **AppleShare IP File Server .....79**

How AppleShare Works .....	80
AppleShare Concepts .....	94
Establishing File Services .....	101
Managing Users and Groups .....	116
Basic File Server Administration .....	143
Advanced File Server Administration .....	159
Improving File Server Performance .....	195
Summary .....	212

## **Chapter 5:**

### **AppleShare IP Web Server.....213**

How the Web Works .....	214
Establishing Web Services .....	222
Basic Web Server Administration .....	249
Advanced Web Server Administration .....	253
Summary .....	264

## **Chapter 6:**

### **AppleShare IP Mail Server .....267**

How Email Works .....	270
Establishing Mail Services .....	275
Basic Mail Server Administration .....	280
Another Email Service: ListSTAR .....	300
Summary .....	330

## **Chapter 7:**

### **AppleShare IP Print Server..... 331**

How Printing Works .....	333
Installing Network Printers .....	341
Installing the Print Server .....	348
Print Server Administration .....	356
Summary .....	365

## **Chapter 8:**

### **AppleShare IP Client and User Support ..... 367**

Configuring Open Transport.....	368
Installing the AppleShare IP Client .....	375
Connecting with AppleShare IP Client.....	383
Working with Access Privileges.....	400
Using Personal File Sharing.....	410
Using Personal Web Sharing .....	418
Using AppleShare IP Email .....	423
Using Network Printing .....	430
Basic User Support .....	437
Advanced User Support .....	457
Summary .....	476

## **Chapter 9:**

### **Server Manager..... 477**

Installing Server Manager.....	479
Using Server Manager Daily .....	483
Applying Server Manager to Specific Tasks .....	512
Summary .....	520

## **Chapter 10:**

### **AppleShare IP and the PC.....521**

Comparing the Macintosh and the PC .....	523
AppleTalk under DOS .....	526
Moving Files in DOS .....	535
AppleTalk under Windows 3.1 .....	537
AppleTalk under Windows 95 and NT .....	549
TCP/IP and Related Services .....	563
Summary .....	570

## **Chapter 11:**

### **MacDNS.....571**

DNS at Work.....	573
Setting up MacDNS .....	576
Monitoring MacDNS .....	597
Summary .....	605

## **Chapter 12:**

### **RunShare .....607**

How RunShare Works .....	608
Installing RunShare.....	609
Working with RunShare .....	609
Summary .....	611

### **Appendix.....613**

### **Index.....621**

# Introduction

With the release of AppleShare IP 5.0, Apple engineers took a basic product designed for small workgroups and gave it greatly expanded, world-reaching capabilities. AppleShare's traditional file server application has been retained, but has been extended to provide service over the nonproprietary File Transfer Protocol (FTP), as well as a fast new hybrid, AppleTalk over TCP/IP (AFP/TCP). The print spooler is there too, but it now manages more queues and printers. An integral Web server and email server are new to the product, along with a bundled DNS server.

This book was written to provide AppleShare administrators with a comprehensive guide to deploying and managing the AppleShare IP-based server. It covers a lot of information beyond the actual use of AppleShare IP, such as hardware configuration, net-



work design, and great third-party applications. As co-author of the now discontinued Apple Certified Server Engineer (ACSE) program, I know how useful that extra knowledge can be.

In a sense, this book is an update to *Managing AppleShare & Workgroup Servers* written by myself and Dorian J. Cougias for AP PROFESSIONAL in 1995. However, I wrote this to be a companion to the earlier book rather than a replacement, so the two cover different ranges of material.

## ACKNOWLEDGMENTS

Thanks go to the Scion Networks team: Juliana Dell for her work as editor, Cass Kovel for her work as designer, and Dan Goldberg for his work on the CD-ROM.

Thanks to John Hanay, current AppleShare product manager; and Joe Sowerby, former AppleShare product manager, for keeping me informed of AppleShare IP's developmental progress. Particular thanks to Renee Shales for coordinating my communications with Apple. Thanks to Apple engineer Greg Burns for reading my drafts and offering valuable suggestions. Thanks to Apple's publications department, especially Michael Hinkson, Toni Childress, and Donna Lee.

Thanks to the third-party vendors whose fine products appear in this book and with whom I've enjoyed working through the years. These include COPS, Inc., Joe Huber; Dantz Development, Walt Hays, Craig Isaacs, and Adam Steinberg; Datawatch Corp., Dovid Coplon and Jan Sutton; Farallon Computing, Ethan Bauman; Neon Software, Michael Swan; Open Door Networks, Alan Oppenheimer; RUN, Inc.; Steven Holder; StarNine Technologies, Inc., Ed Lejarza; and Wave Research, Bill McConnell. Special thanks to Santorini Consulting & Design and Phil Zarboulas for seeding me with a server to work on.

Finally, thanks to the AP PROFESSIONAL team of Tom Stone, Karen Wachs, and Julie Champagne who completed this project, as well as Jeff Pepper, Katie Mulligan, and Jacquelyn Young who began it. Special thanks to Kira Glass for marketing this book so well.



# The Evolution of AppleShare

Although AppleShare IP is something almost completely new to the Mac OS, its history is long and venerable. As early as 1984, a group of Apple engineers—Rich Andrews in particular—produced the first Macintosh file server. Since then, AppleShare has steadily grown more sophisticated and robust.

## APPLESHARE 1.X AND 2.X

Early versions of AppleShare designed for System 6 were modest performers compared to what was to follow. Nevertheless, they were impressive for their time. These versions are no longer in use today.

### AppleShare 2.0.1 Limitations

Connected users	50
Open files	160
Physical volumes	16
Physical volume size	2 Gbytes
File size	2 Gbytes
Users in Users & Groups Data File	2,000
Groups in Users & Groups Data File	2,000
Group memberships per user	16

## APPLESHARE 3.X

AppleShare 3.x was designed for the 68030 processor, which was used by such lovable Macintosh relics as the SE/30 and IIfx. In fact, it runs on any 68K-based Macintosh, from the lowly MacPlus (68000 processor) to the Quadra 950 (68040 processor). It will also run on a PowerPC-based Macintosh, but has no ability to use the newer processor's increased speed.

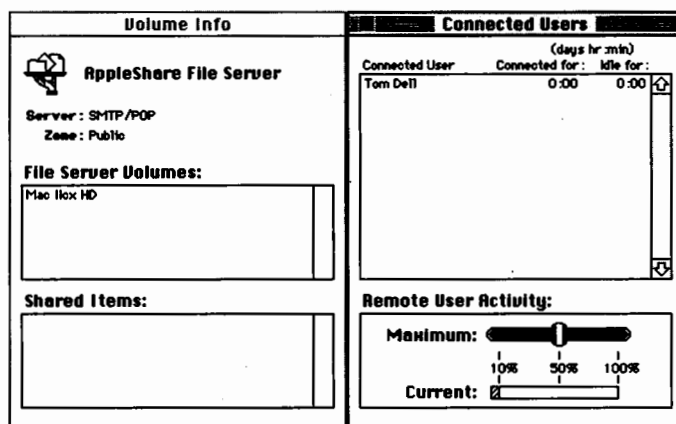


FIGURE 1-1: The AppleShare File Server interface, version 3.

AppleShare 3.x is 32-bit clean, Virtual Memory compatible, and multi-tasking compliant. It requires System 7 or above and at least 4 Mbytes of RAM. Although old, 3.x is still in use today at many organizations. Its last maintenance release was version 3.0.3.

### AppleShare 3.0.3 Limitations

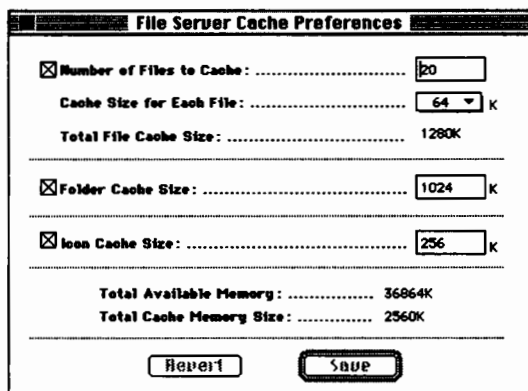
Connected users	120
Outstanding requests	15
Open files	346
Simultaneous launches	120
Physical volumes	50
Physical volume size	4 Gbytes
File size	2 Gbytes
Shared items	50
Users in Users & Groups Data File	8,192
Groups in Users & Groups Data File	8,192
Group memberships per user	42

## APPLESHARE 4.X

While the differences between AppleShare 3.x/4.x and AppleShare IP are the most marked, several changes within AppleShare version 4 are worth noting.

### AppleShare 4.0.2

AppleShare 4.0.2 is touted as being two to three times faster than AppleShare 3.x. This was made possible through RAM caching, a technique that stores commonly used information in a server's RAM before a client computer requests it.



---

FIGURE 1-2: Setting the RAM cache in AppleShare File Server, version 4.

Running under System 7.1 or higher, this version of AppleShare was designed to run on a 68040-based Macintosh, such as the Quadra 950. It requires at least 8 Mbytes of RAM.

### **AppleShare 4.0.2 Limitations**

Connected users	150
Outstanding requests	30
Open files	346
Simultaneous launches	150
Physical volumes	50
Physical volume size	4 Gbytes
File size	2 Gbytes
Shared items	50
Users in Users & Groups Data File	8,192
Groups in Users & Groups Data File	8,192
Group memberships per user	42

## **AppleShare 4.1**

Next came AppleShare 4.1, which boasts Finder operations about 75 percent faster than those of AppleShare 4.0.2 on a similar PowerPC-based Macintosh. It was designed for the Power Macintosh only and was bundled with the Apple Workgroup Server (AWS) line.

AppleShare 4.1's limitations are the same as those of AppleShare 4.0.2. Unlike its predecessor, however, it requires at least 16 Mbytes of RAM and System 7.5 or above.

Beginning with System 7.5, the Mac OS began supporting volume sizes greater than 4 Gbytes. However, since AppleShare's core AppleTalk Filing Protocol (AFP) allows a maximum of 4 Gbytes, that continued to be the maximum size of an AppleShare volume. Also, the maximum number of files that can reside on any Macintosh volume is limited to 65,536 by the Mac OS' Hierarchical File Structure (HFS).

## AppleShare 4.2.1

The last of this series was AppleShare 4.2.1, which supports multihoming—the ability to reside on more than one network simultaneously—and a far greater number of open files. Apple claims a performance increase of 111 percent for file transfers over AppleShare 4.1. Where the server hosts a multiuser database, a performance increase of 352 percent was reported.

AppleShare 4.2.1 can be used with both NuBus- and PCI-based Power Macintosh computers and was made available separate from the Apple Workgroup Server. It runs under System 7.5.1 or above and requires at least 16 Mbytes of RAM.

### AppleShare 4.2.1 Limitations

Connected users	250
Outstanding requests	64
Open files	3,000
Simultaneous launches	150
Physical volumes	50
Physical volume size	4 Gbytes
File size	2 Gbytes
Shared items	100
Users in Users & Groups Data File	8,192
Groups in Users & Groups Data File	8,192
Group memberships per user	42

# APPLESHARE PRO

I would be remiss if I did not mention Apple's experiment with running AppleShare on the kernel of its implementation of the UNIX operating system, A/UX. Called AppleShare Pro, this version showed significant performance increases. It required A/UX 3.1 and 16 Mbytes of RAM.

## AppleShare Pro Limitations

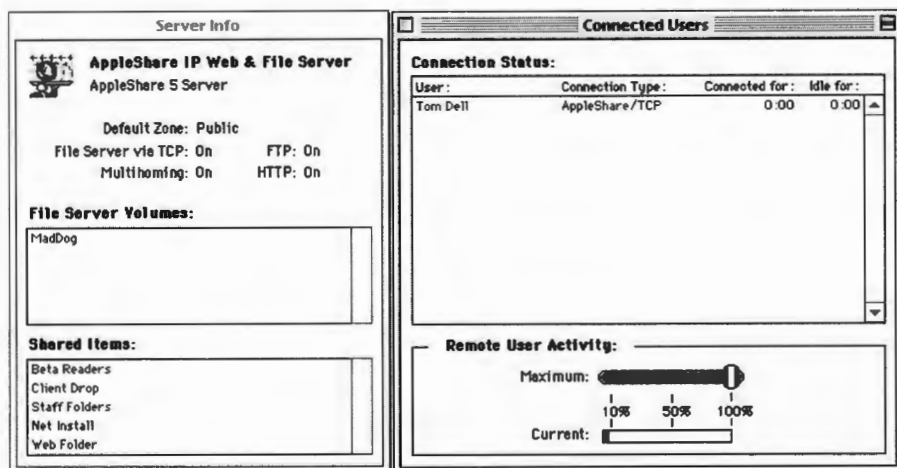
Connected users	200
Outstanding requests	50
Open files	5,000
Simultaneous launches	200
Physical volumes	50
Physical volume size	4 Gbytes
File size	2 Gbytes
Shared items	50
Users in Users & Groups Data File	8,192
Groups in Users & Groups Data File	8,192
Group memberships per user	42

Apple dropped this implementation soon after it was introduced.



## APPLESHARE IP

AppleShare IP can be run on many Macintosh and Mac OS-compatible computers, not just the Apple server line. It is the first version in which Apple expands its file services beyond AppleTalk to include the Internet's TCP/IP, and it adds an email server and Web server to the product's file server and print server offerings.



---

FIGURE 1-3: AppleShare File Server, version 5.

The first version of AppleShare IP, version 5.0, requires System 7.6 and Open Transport 1.1.2, and is based on OpenDoc technology. Later versions support Mac OS 8 and newer versions of Open Transport. It requires at least 32 Mbytes of RAM.

### **AppleShare IP 5.0 Limitations**

Connected users	250
Unique open files	364
Open files (all)	3,000
Simultaneous launches	250
Physical volumes	50
Physical volume size	2 Tbytes
Shared items	100
Users in Users & Groups Data File	4,096
Groups in Users & Groups Data File	4,096
Group memberships per user	42
Multihomed AppleTalk Ports	4

As you will see in the coming chapters, AppleShare IP is the most radical update of the original Apple file server product.

## **SUMMARY**

AppleShare was first developed in 1984. The first versions were modest but impressive for their time. AppleShare 3.x was the first version created for use with System 7 and is still used at some sites today. AppleShare 4.x increases performance dramatically through RAM caching and PowerPC-native code.

AppleShare IP represents a radical upgrade to Apple's previous server offering. It works over TCP/IP as well as AppleTalk and adds an email server and Web server to the product's file server and print server offerings.





# The Macintosh Server

When you examine the range of computers designated as servers, you find they can be separated into two types. There are “true” server machines, which function specifically to read and write data from storage media and pump that data out over a network as fast as possible. There are also less capable machines that were originally designed to be desktop workstations but have been “souped up” with high-throughput hardware to help them behave like servers.

True servers are generally described in terms of how many users they can transfer data to and from concurrently and how fast they can do it. This is the high-end of the marketplace characterized by powerful hardware and complex software such as Novell’s Net-

Ware, Microsoft's Windows NT Server, and IBM's AIX (a version of UNIX). Apple's AIX-based Network Server line is designed to fit this role.



---

FIGURE 2-1: Apple's true server: *The Network Server.*

The Network Server 500 and 700 are truly impressive machines, specially designed to be fast and exceptionally fault tolerant. For example, their wheeled cabinets contain redundant tray-mounted hard drives. Should one crash, another comes on-line without interrupting file services. The drives are "hot-swappable," meaning that they can be removed and replaced while the server is running. Apple created these servers to meet the needs of their most demanding publishing, education, and technology customers.

The Network Server line, and all true servers, have a couple of drawbacks. First, they are more expensive than what many organizations can reasonably afford. Second, they are often difficult to work with. Even Apple, the ease-of-use king, would have to admit that its AIX-based Network Servers require expert administration. Another type of server is

needed to fit the so-called SOHO (for “Small Office Home Office”) market as well as smaller schools, publishing houses, and design firms. For this market AppleShare IP and the Apple Workgroup Servers were created.

## APPLE WORKGROUP SERVERS

The Apple Workgroup Servers are Macintosh computers that have been beefed up with fast processors, cache cards, lots of RAM, and larger-than-normal storage media. They come in several configurations to meet most organizations’ budget and performance requirements. Perhaps best of all, they are based on the Mac OS and are bundled with easy-to-administer software such as AppleShare IP.

The Apple Workgroup Server line has evolved through several generations. At the time of this writing, the line includes the following specialized Macintosh computers.

## Workgroup Server 9650/350



---

*FIGURE 2-2: The AWS 9650.*

The top-of-the-line AWS 9650/350 is based on a 350-MHz PowerPC 604e processor. It ships with 64 Mbytes of RAM and can be upgraded to as much as 768 Mbytes. RAM is far faster than any storage device such as a hard drive. The more data you can load into RAM from a storage device, the faster your server will perform while giving out that data.

The 9650/350's 1-Mbyte Level-2 memory cache permits it to accept incoming data and queue outgoing data when received more quickly than a given Input/Output (I/O) device, such as a hard disk or the Network Interface Card (NIC), can process it. This significantly increases data throughput and server responsiveness.

The server is equipped with six high-speed PCI (Peripheral Component Interconnect) slots for expansion cards, such as modems or multiple NICs. It comes with two internal 4-Gbyte hard drives that can be mirrored in a manner similar to that of the Network Servers. Data is transferred from the hard drives to RAM via an Ultra/Wide SCSI-3 interface, which is capable of 40 Mbps throughput. In addition to this Small Computer System Interface (SCSI) bus, there are two more for further expansion. One is an internal Fast SCSI-2 bus capable of 10 Mbps throughput. The other is the traditional external SCSI-1 bus, capable of 5 Mbps throughput. The server also comes with an internal 24-speed CD-ROM drive.

On the networking side, the server comes with an auto-switching 10-Mbps/100-Mbps Ethernet NIC, along with the Macintosh's traditional built-in Ethernet and LocalTalk. Other networking topologies such as Fiber Distributed Data Interface (FDDI), Asynchronous Transfer Mode (ATM), and Token Ring can be supported by adding another PCI NIC.

## Workgroup Server 9650/233

The AWS 9650/233 is a slight step down in price and capability. Its configuration includes:

- a 233-MHz PowerPC 604e processor
- 64 Mbytes of RAM, expandable to 768 Mbytes
- a 512K Level-2 cache
- six PCI expansion slots
- one 4-Gbyte hard disk on the internal Ultra/Wide SCSI-3 bus. The Fast SCSI-2 internal bus and SCSI-1 external bus are here as well
- an internal 12-speed CD-ROM drive
- built-in Ethernet and LocalTalk



## Workgroup Server 7350/180



---

FIGURE 2-3: AWS 7350 and AWS 7250.

Next in line is the AWS 7350/180, which is housed in a smaller desktop case than the 9650's tower case. Although it resembles all of the other basic Macintosh computers that share its form, it is much more powerful than any of them. Its configuration includes:

- a 180-MHz PowerPC 604e processor
- 48 Mbytes of RAM, expandable to 512 Mbytes
- a 256K Level-2 cache
- three PCI expansion slots
- an internal 4-Gbyte hard disk drive; one internal Fast SCSI-2 bus; and one external SCSI-1 bus
- an internal 12-speed CD-ROM drive
- built-in Ethernet and LocalTalk

## Workgroup Server 7250/120

The server designated as the entry-level machine shares the same case but has few of the same capabilities the AWS 7350 has. Its configuration includes:

- a 120-MHz PowerPC 601 processor
- a 256-Kbyte Level-2 cache
- 16 Mbytes of RAM, expandable to 256 Mbytes
- three PCI expansion slots
- an internal 2-Gbyte hard disk drive on a SCSI-1 Direct Memory Access (DMA) bus that supports three internal and four external storage devices (although there is only room in the case for one more device)
- an internal 8-speed CD-ROM drive
- built-in Ethernet and LocalTalk

Although this server is a wimp compared to its newer brethren, it is still formidable enough to meet the needs of many small and medium-sized workgroups. It is also equal to or better than earlier generations of the AWS, many of which can also be upgraded to run AppleShare IP and meet the needs of small workgroups.

## Earlier Generations

The following computers are no longer sold by Apple, although if you have one, your investment need not be wasted. Several of them can run AppleShare IP, and several others can be upgraded to do so.

### Workgroup Server 9150

The former king of the AWS hill was introduced in 1994. Its first configuration was based on a 80-MHz PowerPC 601 processor. This was later

upgraded with the introduction of the AWS 9150/120 with its 120-MHz PowerPC 601 processor. Both models will run AppleShare IP, but only the AWS 9150/120 is powerful enough to do it well.



---

FIGURE 2-4: AWS 9150.

The 9150's configuration includes:

- 16 Mbytes of RAM, expandable to 264 Mbytes
- a 1-Mbyte Level-2 cache
- four NuBus expansion slots—significantly slower than those of the PCI bus
- one processor-direct slot (PDS)
- one or two internal 1-Gbyte, 2-Gbyte, or 4-Gbyte hard drives (with space for up to five internal 3.5-inch half-height hard drives)

- an internal DDS-2 Digital Audio Tape (DAT) drive
- an internal 4-speed CD-ROM drive
- two SCSI-1 DMA buses, one internal and one external
- built-in Ethernet and LocalTalk

## Workgroup Server 8550

The AWS 8550/132 is based on a 132-MHz PowerPC 604 processor. It was later upgraded to the AWS 8550/200, which is based on the 200-MHz PowerPC 604e processor. Both are quite capable of running AppleShare IP. In fact, this book was written using AppleShare IP on an AWS 8550/132.



---

FIGURE 2-5: AWS 8550.

The 8550's configuration includes:

- 32 Mbytes of RAM, expandable to 512 Mbytes
- a 512K Level-2 cache
- three PCI expansion slots
- an internal 2-Gbyte hard drive (with room for a storage device)
- an internal 8-speed CD-ROM drive
- an internal DDS-2 DAT drive
- two SCSI DMA buses
- built-in Ethernet and LocalTalk

## **Workgroup Server 8150**

The 8150 was introduced in 1994 and discontinued a year later. It is housed in a case similar to what was later used by the AWS 8550. Based on an 80-MHz 601 processor, the 8150 will also run AppleShare IP, although it would be best to keep its workload light.

The 8150's configuration includes:

- 8 Mbytes of RAM, expandable to 264 Mbytes
- an internal SCSI 500-Mbyte or 1-Gbyte hard drive
- three NuBus expansion slots and 1 PDS
- built-in Ethernet and LocalTalk

## **Workgroup Server 6150**

The 6150 uses a case affectionately referred to as the "pizza box." It is based on a 66-MHz PowerPC 601 processor and will run AppleShare IP, although only under the lightest of workloads. If you have an AWS 6150, 8150, or 9150, you will probably find that an upgrade is a good idea.



---

FIGURE 2-6: AWS 6150.

The AWS 6150's configuration includes:

- 16 Mbytes of RAM, expandable to 72 Mbytes
- a 256-Kbyte Level-2 cache
- one NuBus expansion slot and one PDS
- an internal 700-Mbyte hard drive, with room only for one
- an internal 4-speed CD-ROM drive
- one SCSI bus supporting two internal and five external devices
- built-in Ethernet and LocalTalk

## Workgroup Server 95

The AWS 95 is an oddity. Introduced in 1993, it is not quite sure whether it should be a UNIX machine or a Macintosh. In fact, it is a Quadra 950 based on a 66-MHz 68040 processor that runs A/UX, Apple's now-discontinued version of UNIX. This machine will not run AppleShare IP.

The AWS 95's configuration includes:

- 8 Mbytes of RAM, expandable to 256 Mbytes
- an internal 230-Mbyte or 1-Gbyte SCSI hard disk
- five NuBus slots and one PDS
- built-in Ethernet and LocalTalk

Although this was not a very successful Apple offering, it did portend the introduction of the Network Servers a few years later.

## Workgroup Server 60 and 80

Together with the AWS 95, the AWS 60 and AWS 80 launched the line in 1993. They too are 68K machines (i.e., based on the Motorola 68040) and therefore incapable of running AppleShare IP.

These machines no longer work as servers, but they might have some life left as desktop workstations.

## Building Your Own Server

Although the AWS line was created to provide server-capable Macintosh computers at a reasonable price, there is nothing to stop you from creating your server using Apple upgrade options, third-party hardware, and even Mac OS clones. If the server is to run AppleShare IP, however, it must meet the following minimum requirements:

- a 601, 604, or 604e PowerPC processor (for AppleShare IP 5.0; later versions support additional processors)
- 32 Mbytes of RAM
- 10 Mbytes of RAM
- a CD-ROM drive

## SUMMARY

AppleShare IP and the Apple Workgroup Servers were designed for small and medium-sized networks. There have been several generations of AWS. Most of these servers can run AppleShare IP.

Other Mac OS computers besides the AWS line can run AppleShare IP, so long as they meet the minimum system requirements.



# Installing the Macintosh Server

Installing a new Macintosh server is best done in several steps. First, install any supplemental hardware to the CPU; this could include larger storage media, additional RAM, a backup DAT drive, or a cache card. Second, place the server in a secure location, perhaps a dedicated “server room” or some workroom or closet. Third, determine the best place to put the server on the LAN; this will most likely be on a network segment close to the majority of your users with the greatest bandwidth available to it. Fourth, install the AppleShare IP software; this is made simple by the AppleShare IP Easy Setup application.

Upgrading a Macintosh server requires a couple of additional steps, primarily backing up the hard drive. When you have com-



pleted all the other steps, you may then restore users' folders, files, and associated privileges from that backup.

In the following pages I will assume that you are installing AppleShare IP on a new Macintosh server of a configuration similar to those I mentioned in Chapter 2. If you are upgrading an existing server, this information will still be valuable to you. I will add some information unique to your situation at the end of the chapter.

## BACKING UP THE HARD DRIVE

If you are installing a new Macintosh server, it is a good idea to back up its hard drive prior to installing AppleShare IP. If you encounter a severe problem during the new software's installation, this will permit you to restore the server machine to the state it was in before the attempted installation. Then you can determine the cause of the problem and try installing again.

If you are upgrading a Macintosh server from AppleShare 3.x or 4.x, you *must* back up the hard drive before installing AppleShare IP. This will be a *milestone backup*, the purpose of which is to capture everything on the hard drive—system software, invisible files, application preferences, user folders, files, and privileges—before any major change is made to the server. Such a backup ensures that you can always return your server to its previous configuration if something goes wrong with new software or hardware.

## Backing up with Retrospect

Here is how to perform a milestone backup using Dantz Development Corp.'s Retrospect and a Digital Audio Tape (DAT) drive, the most common configuration for Apple servers.

## Get a New DAT

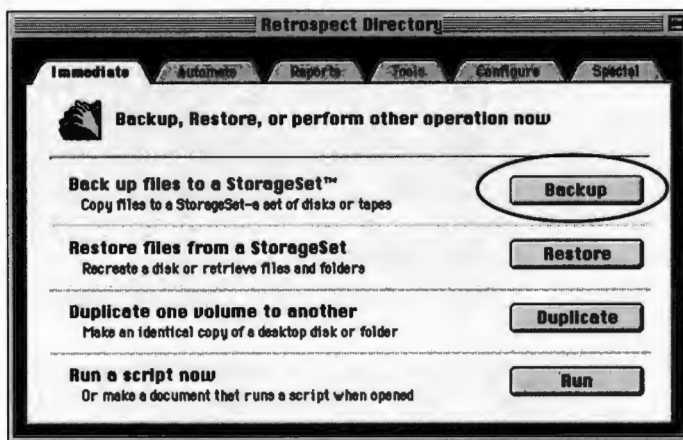
You may be restoring all of your server's vital data from this backup, so you should take great pains to ensure that the recording will be free from errors. The best way to do this is to use a DAT that is "fresh."

## Log off Users

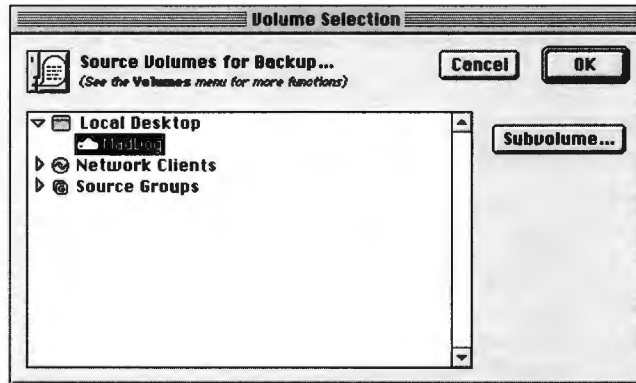
In order to preserve AppleShare's privileges so that you can revert to them, you must back up the server while AppleShare is running. While the backup is being performed do not permit users to make changes to the server's volumes. The best way to guard against users inadvertently logging back on to the server after you have warned them to log off is to remove the server from the network by unplugging the patch cable from the wall.

## Prepare to Run the Backup

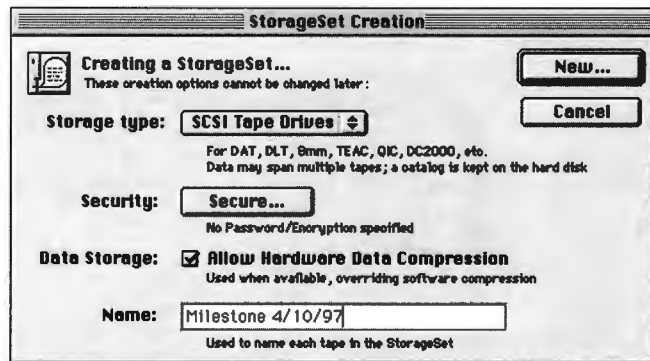
To prepare Retrospect for this task, launch the application and press the **Backup** button under the **Immediate** tab in the Retrospect Directory window.



This will open the Volume Selection window, in which you should highlight the server's hard drive (under **Local Desktop**) and then press the **OK** button.

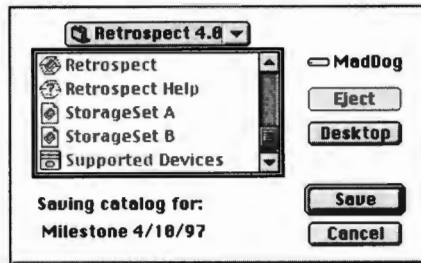


Now that Retrospect knows what you want to back up, create a *StorageSet* for it to back up to in the StorageSet Creation window. StorageSets are what Retrospect calls its backup sets. They may contain multiple volumes and span multiple storage media. Give the StorageSet a meaningful name; then press the **New** button.

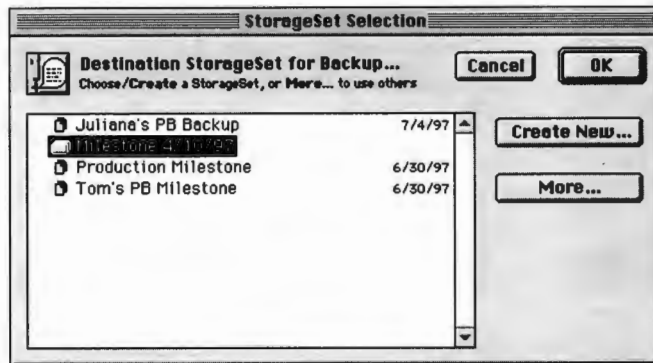


Once you have named the milestone backup StorageSet (e.g., "Milestone 4/10/97"), Retrospect will create a *catalog* of its contents for later search and retrieval. Permit the creation of this catalog by pressing the **Save** but-

ton. It is best to save catalogs in the Retrospect folder, where they will be easy to find later.

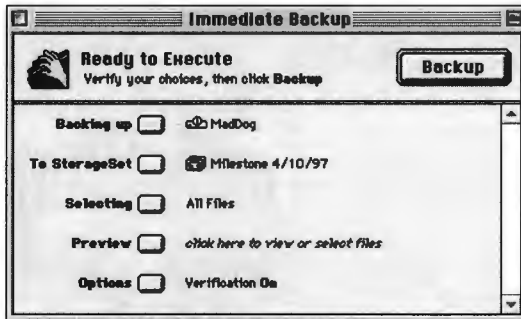


Retrospect will ask you to verify your creation in the StorageSet Selection window. Just press the **OK** button here, which will complete your setup and take you to the Immediate Backup window.

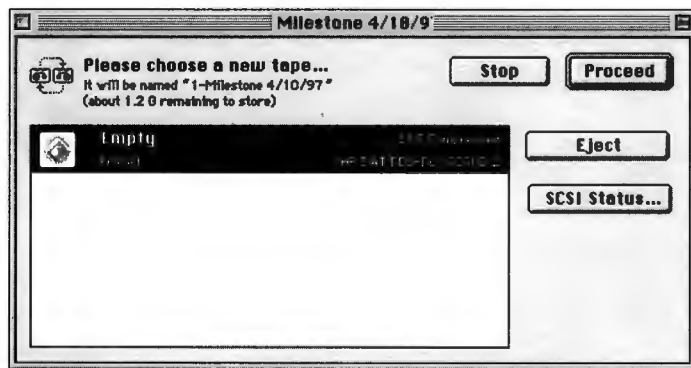


## Run the Backup

In the Immediate Backup window, verify that the server's hard drive is listed beside the **Backing up** button. The name of the new StorageSet should appear beside the **To StorageSet** button; "All Files" should be the criterion beside the **Selecting** button; and "Verification On" should be listed beside the **Options** button. If any of these settings are incorrect, use the buttons to reset them. You may then press the **Backup** button.



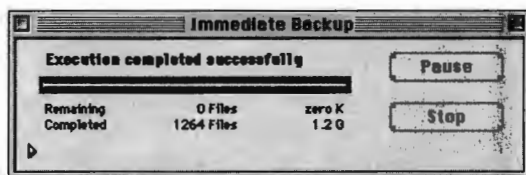
Next, you will be asked for backup media. Make sure a new DAT is in the drive and then press the **Proceed** button.



You will be able to watch Retrospect's progress.

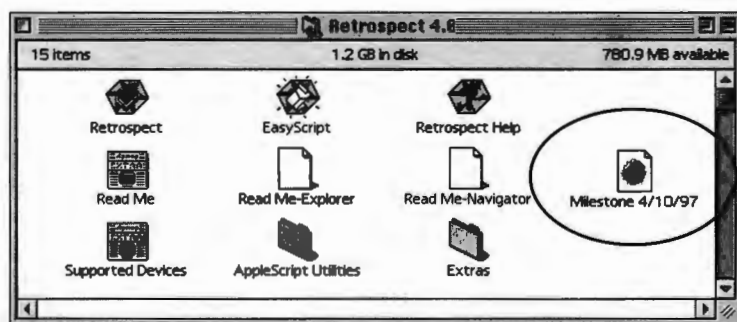


If all goes well, you will be notified that the backup was successful.



## Store the Backup Catalog and DAT

While it is possible to create a catalog from DAT-based StorageSet, save yourself some time by saving the catalog Retrospect already created. Copy this file from the server's hard drive onto a floppy diskette or network volume.

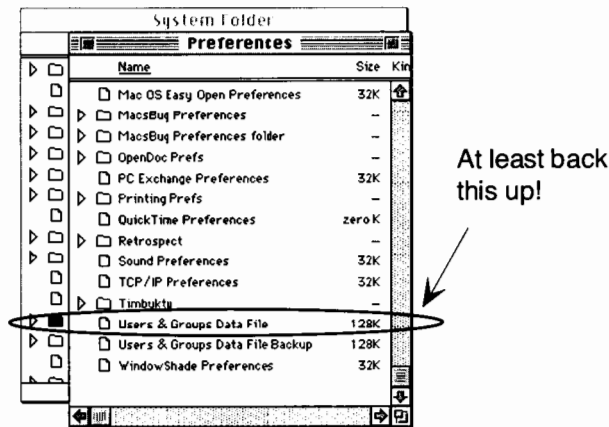


Before installing the server, remove the DAT tape from the server's tape drive and put it in a safe place. You now have the peace of mind of knowing that should something go wrong in the following steps, such as the server's hard drive crashing or the logic board being damaged, your users' data will not be lost.

If you do not have a DAT drive, you can use another type of storage device. Retrospect accepts a wide variety of removable media or another hard drive. If you do not have Retrospect, I strongly recommend that you get it. It is the best backup software on the market and is second in importance only to AppleShare IP itself. I will discuss it further in later chapters.

## Back up the Users & Groups Data File

If you have neither backup software nor a backup drive and you are upgrading from AppleShare 3.x, 4.x, or Personal File Sharing, do not proceed without at least backing up the “Users & Groups Data File” to a floppy diskette. This file contains all of the user, password, and privilege information. You will find it in the Preferences folder inside the System Folder on the Startup Disk.

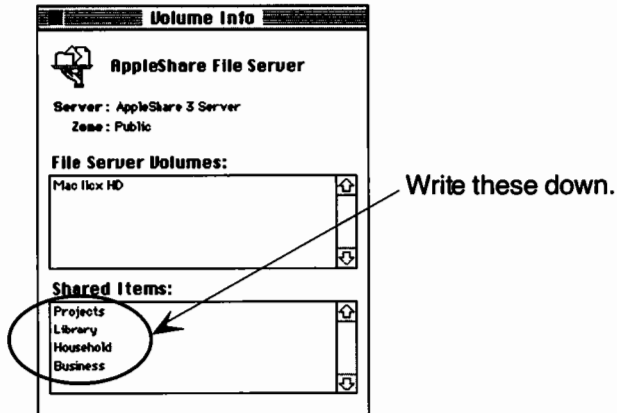


Unfortunately, this precaution will not permit you to back up AppleShare's Parallel Directory Structure (PDS) file, which is invisible. You would need this if you decided to revert back to an earlier version of AppleShare.

If you want the details of server and workstation backups, including how to perform them over the network, pick up a copy of *The Complete Guide to Mac Backup Management* by Dorian J. Cougias and Tom Dell (AP PROFESSIONAL, 1995).



*Note: If you plan to restore a backup of an AppleShare 3.x/4.x server to an AppleShare IP server, thereby migrating from one version to the other, make a note listing the exact names of all of the top-level shared folders. For example, if you made four folders on the server into shared volumes, you will need to record that.*



*If you find this confusing, read Chapter 4 before continuing with the AppleShare IP installation.*

---

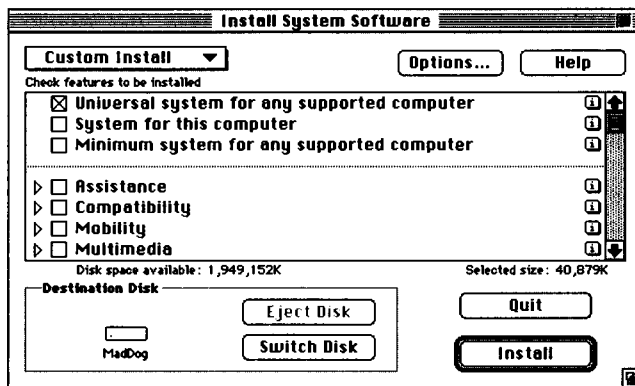
## Are You Ready for a Rainy Day?

Having been a network consultant for many years, one of the best pieces of advice I can give any server administrator is to get what I call a “Rainy Day Drive.” This is an external hard drive that gets a Macintosh server or workstation up and running quickly in the event of a system or hard disk crash. I recommend that you keep at least the following on it:

- A “universal” system: a version of the Mac OS that will boot any Macintosh. You can install a universal system on an empty hard



drive using the **Custom Install** option. Make sure that your Rainy Day Drive's system is always up to date.

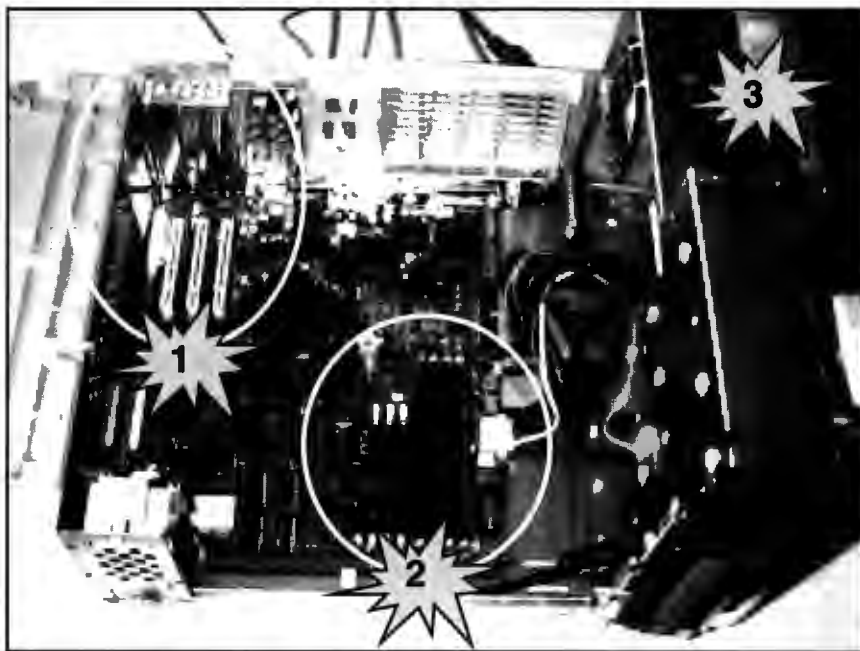


- Mac OS installer disks and updaters.
- The latest versions of Apple's Disk First Aid, Apple HD SC Setup (SCSI), and/or Drive Setup (IDE).
- Third-party device drivers.
- Updaters for your organization's common applications, especially those that are often affected by changes in the Mac OS (e.g., Connectix RAM Doubler and Speed Doubler, Symantec's Norton Utilities, or anything else that makes changes to the directory structure or Finder operations).
- The most recent version of Symantec's Norton Utilities. Be aware that versions incompatible with the current Mac OS have been known to cause data loss.
- Any other utility or diagnostic software that cannot be run from a Startup Disk.
- Retrospect and its catalog files.
- Santorini's Server Tools and Server Manager.
- A SimpleText file containing your essential registration codes and passwords, particularly the registration number and Admin code for AppleShare.

- Any file encryption/decryption utilities being used at your organization (Kent Marsh's FolderBolt, UsrEZ Software's UltraShield, etc.).

## INSTALLING ADDITIONAL HARDWARE

To make the Macintosh running AppleShare IP into a server-class machine, you may need to add RAM, expansion boards, and additional storage devices. Here is how you go about it.



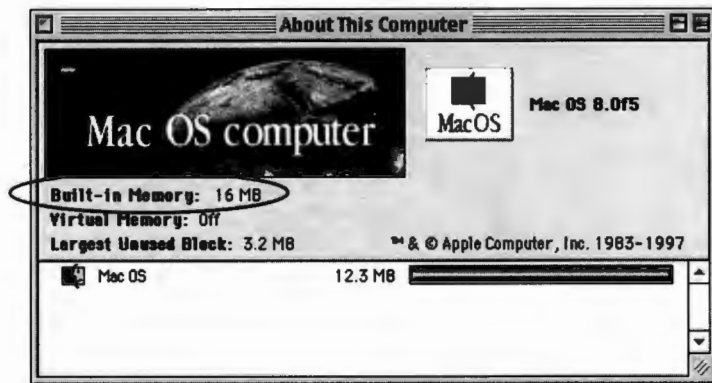
---

**FIGURE 3-1:** View of an open Apple Workgroup Server 7250. (1) PCI bus. (2) RAM bus. (3) Housing for power supply, CD-ROM drive, and hard disk.

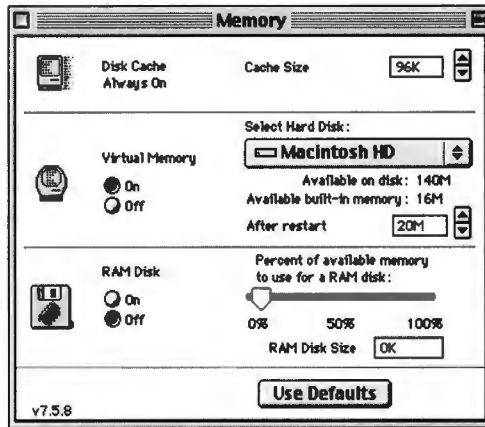
## RAM

AppleShare IP will run under 32 Mbytes of RAM, but 48 Mbytes is the preferred minimum under which to run all of AppleShare IP's components. If you purchased the base model Apple Workgroup Server 7350 or Apple Workgroup Server 9650, you already have that. If you have an older Apple Workgroup Server, however, you might need to add additional RAM or use *Virtual Memory* (plus 32 Mbytes of real RAM). I recommend that whatever Macintosh you use should have no less than 48 Mbytes of RAM installed. If you plan to use third-party applications such as Retrospect or Santorini's Server Manager and Server Tools on the server Macintosh, you should install still more RAM.

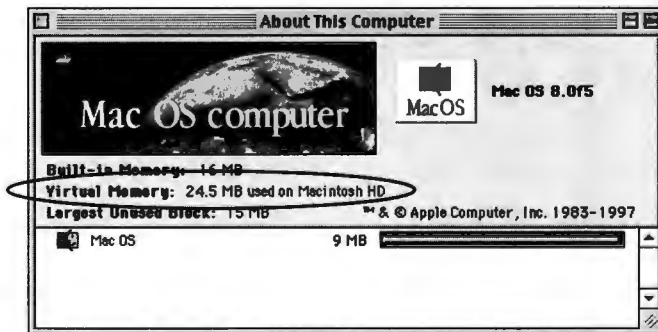
If you are not sure how much RAM the designated server Macintosh already has, find out by choosing **About This Computer** under the **Apple** () menu bar item.



One alternative to adding more physical RAM is to enable Virtual Memory. This can be done using the Memory control panel.



When engaged, Virtual Memory uses hard drive space to increase a system's usable RAM.



However, because Virtual Memory is much slower than physical RAM it cannot be considered an equal substitute.

Apple Workgroup Servers and other Mac OS computers use Dynamic Random Access Memory (DRAM) chips in their RAM configurations.

Second-generation (PowerPC-based) Apple Workgroup Servers 6150, 8150, and 9150 have 8 Mbytes of RAM soldered directly on their logic boards. Their RAM configurations can be expanded with 72-pin Single Inline Memory Modules (SIMMs) of 80ns speeds or better in pairs of 4, 8, 16, or 32 Mbytes each. There are two SIMM slots in the Apple Workgroup

Server 6150 and eight in the 8150 and 9150. The 6150 can be upgraded to a total of 72 Mbytes of RAM; the 8150, to 256 Mbytes; and the 9150, to 264 Mbytes.

Third-generation Apple Workgroup Servers 7250 and 8550 have no RAM soldered directly on their logic boards. Their RAM configurations can be expanded with 168-pin Double Inline Memory Modules (DIMMs) of 70ns speeds or better in pairs of 4, 8, 16, 32, or 64 Mbytes each. There are four DIMM slots in the Apple Workgroup Server 7250 and eight in the 8550. The 7250 can be upgraded to a total of 256 Mbytes of RAM; the 8550, to 512 Mbytes.

## Installing RAM Modules

Here are the steps to adding RAM to a Macintosh. (Apple recommends that this be done by Apple-authorized dealers only.)

***Unplug the computer and get grounded.*** Make sure to discharge any static electricity that might be on your body by placing your hand on the power supply (see Figure 3–1). Better still, use a *grounding strap* that attaches between the power supply and your wrist. These straps often come with the memory modules you buy. Static electricity can ruin computer circuitry and give you a nasty shock.

***Remove old memory modules.*** You might have to remove old memory modules to make room for new ones. For instance, to bring an Apple Workgroup Server 6150 up to 40 Mbytes you need to remove the two 8-Mbyte SIMMs already in it to make room for two 16-Mbyte SIMMs. Do this by placing your thumbs and forefingers at both ends of the memory module. Use your forefingers to release the locking tabs and your thumbs to tilt the SIMM back and out of the RAM bus. Always handle memory modules by the edges.

***Install new memory modules.*** Perform the last step in reverse to do this. Place the memory module in the RAM bus and make sure the pins in the bus line up with the metallic tabs on the memory module. Next, place your thumbs and forefingers at both ends of the memory module and press the module into the bus at an angle. With your forefingers applying an even pressure, use your thumbs to press the memory

module forward into the RAM bus. When properly aligned, the locking tabs will snap into place. This requires very little force, so if you have to push hard the memory module is probably misaligned. Be careful—they break easily.

**Verify the upgrade.** Boot up the Macintosh and select **About This Computer** under the **Apple ()** menu bar item to confirm that the Mac OS is addressing the new RAM.

## Expansion Boards

Peripheral expansion boards can be added to the Macintosh's logic board through its NuBus slots, Processor-Direct Slots (PDS), or PCI (Peripheral Component Interconnect) slots. Such peripherals include network interface cards, graphics accelerator cards, modems, and high-speed I/O cards.

The Apple Workgroup Server 6150 has one PDS slot that can be fitted with an adapter to support NuBus cards up to seven inches long. The 8150 has one PDS slot and three NuBus slots; the 9150 has one PDS slot and four NuBus slots.

Apple Workgroup Servers 7250, 8550, and later abandon the NuBus interface in favor of three PCI slots (see Figure 3–1). The Apple Network Servers and most third-party Mac OS machines use the faster PCI as well.

## Installing Expansion Boards

Here is how to add an expansion board.

**Unplug the computer and get grounded.** Discharge static electricity by placing your hand on the power supply or employing a grounding strap.

**Open the case.** The procedure for opening the cases on various Macintosh computers varies, but they are usually straightforward. Consult the Apple manual if you need to.

**Choose a bus slot.** Decide which bus slot you will place the expansion board in, then remove its protective plate from the back of the machine. Do not lose the screw!

**Plug in the expansion board.** Hold the expansion board by the edges and hook the metal tab that sticks up on the back of the card under the small bracket on the computer's case by turning the card slightly. Next, tilt the board until it settles firmly into the bus slot. It should require only moderate pressure. Do not force it.

If the expansion board has a hole for this purpose, use the screw that you took from the bus slot's protective plate to secure the card.

**Verify the upgrade.** Boot up the Macintosh. If it does not immediately crash, the installation is probably successful. Install any software driver that came with the expansion board and test its workings.

## Storage Devices



Storage devices and other peripherals can be added to the Macintosh using Apple's standard Small Computer System Interface (SCSI) port. These include hard drives, CD-ROM drives, removable media drives (SyQuest, Zip, Jaz, etc.), DAT drives, scanners, and some printers. You will find this 25-pin female port on the back of the Macintosh labeled with an icon that looks somewhat like a "G," like the picture to the left.

SCSI peripheral devices usually have a couple of 50-pin Centronics female ports on the back of them, although they may also have a 25-pin female port (e.g., Zip drive). Peripherals can be daisy-chained together using SCSI cabling to form a *SCSI chain*.

Most Macintoshes can have a total of seven devices supported by their SCSI chains, although the number varies with the type of Macintosh the chain is attached to. Usually the internal hard drive and CD-ROM drive will use two positions, leaving you with five more. The Apple Workgroup Server 7250, for instance, has a single Direct Memory Access (DMA) bus that supports four external devices and three internal devices. The Apple Workgroup Servers 8150 and 9150 have two SCSI buses and

can support as many as 14 SCSI devices—seven on each bus. The 8550 also has two SCSI DMA buses and supports eight devices.

Each device on a SCSI chain must have a unique number, referred to as a *SCSI ID*. This number, from zero to seven, determines the order in which devices are allowed to send data across the SCSI bus. Higher numbers have higher priority. SCSI address numbers never include floppy disk drives. The default SCSI IDs are:

- 0—Commonly used for the internal hard drive
- 2—External Apple CD-ROM drives
- 3—Internal Apple CD-ROM drives
- 5—Apple scanners
- 7—The Macintosh logic board

Each SCSI chain ends with a *SCSI terminator*, which can be either an internal resister or an external plug that is inserted into the last port of the last device on the chain. The terminator is designed to reduce interference on the SCSI chain, caused when signals *echo* or reflect from the end back down the electronic path formed by the chain.

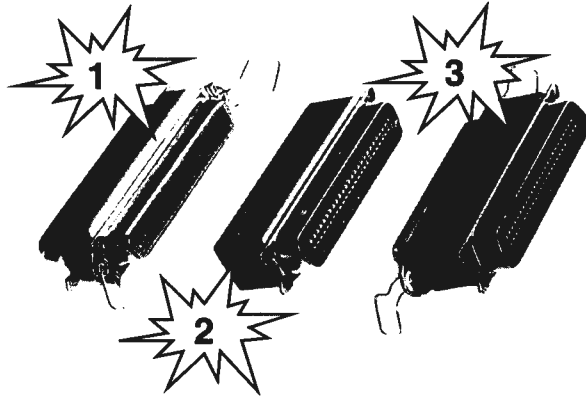
Termination is important. A bad signal produced anywhere along the SCSI chain can cause the server to crash. Improper termination can result in devices not being recognized by the Macintosh at all.

SCSI terminators come in three types:

## **External Terminator Plugs**

These are palm-sized hardware plugs of three designs:





The first type has a 50-pin female port on one side and a 50-pin male port on the other side. It is placed between one of an external device's 50-pin Centronics ports and the end of a SCSI cable.



The second type has a single 50-pin male port that plugs into either of a device's two Centronics ports.



The third type can be either of the two previously mentioned types but is black plastic instead of the traditional gray. This rarity is used in connecting external hard drives to the old Macintosh IIx and to the LaserWriter IIx, IIg, and Pro 630, and is designed to compensate for differences in these machine's controller chips. It should not be used with any other type of Macintosh.

## Internal Terminators

These are removable resistor packs placed on the SCSI device itself. On-device terminators need to be removed if you add a second device to your server. Some drives have soldered, nonremovable resistors that are enabled or disabled with a jumper. When you remove a terminator take careful note of its orientation. Most are polarized and will not work if you reinsert them a different way.

## Switched Terminators

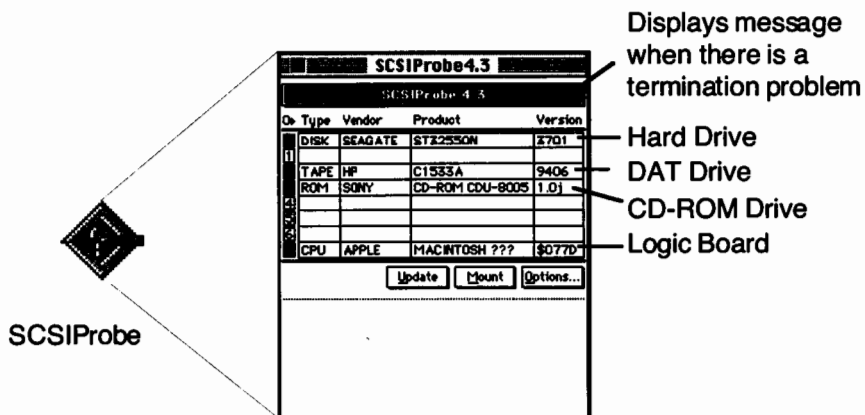
Many peripheral vendors provide a simple termination on/off switch, sometimes accompanied by an LED.

## Installing Storage Devices

Here is how to install a chain of SCSI devices on an Apple Workgroup Server.

**Turn off the computer.** Make sure the server and all of its peripheral devices are turned off.

**Set the SCSI ID switches.** Use the switch on the SCSI devices to give each one a unique number. These switches vary with the device manufacturer, but will usually be a thumb wheel, a toggle switch, DIP switches, or software. The logic board is always at SCSI ID 7, having the highest priority. The first internal hard drive is usually at SCSI ID 0. If there is another internal device such as a DAT or CD-ROM drive already installed and you do not know its SCSI ID, you will need a software utility to determine its address. The best known utility for this is the freeware SCSIProbe control panel.



You must avoid duplication. If two devices have the same SCSI ID, the resulting confusion will cause startup problems and can lead to data loss.

SCSIProbe will also tell you when the SCSI chain is improperly terminated.

By the way, the best SCSI ID for your “Rainy Day Drive” is “6” because it is seldom used by other devices and takes priority if no other Startup Disk is specified.

**Connect SCSI cables.** SCSI cabling comes in several types. A *system cable* has a 25-pin male connector at the computer’s end and a 50-pin male connector at the SCSI device end. The *peripheral interface cable* has a 50-pin male connector at both ends. A *cable extender* has a 50-pin male connector at one end and a 50-pin female connector at the other.

There are a few things to avoid when hooking up these cables. First, you should not use more than 20 feet of cable, because the signal deteriorates beyond that length. Cables of between 18 and 24 inches are best. Second, you should always use the metal clamps and screws on the cables to maintain a tight connection. Finally, always use high-quality cables and do not mix brands as each may have different impedance characteristics, and changes in impedance cause reflections that interfere with the signal.

**Terminate the SCSI chain.** The SCSI chain begins with the Macintosh’s internal hard drive and ends with the external device furthest down on the SCSI chain. Only terminate the first and the last devices on the SCSI chain.

If you have problems, there are some exceptions to the SCSI chain rules you might try. If the total cable length between all devices in the SCSI chain is 18 inches or less, you might need to terminate just *one* end. If the total cable length between all devices in the SCSI chain is greater than 10 feet, you might need to terminate it at both ends *and* at the 10-foot point.

The Apple Workgroup Servers can have problems if used with devices that supply termination power to their internal SCSI buses. Any drives which are attached to this bus should be configured with such features disabled.

**Power the SCSI chain.** You should power SCSI devices starting from the last device on the SCSI chain and working your way back to the

server. It is also best to power up all devices, even when you do not plan to use them all. Never turn off a SCSI device while the server is on.

**Standardize SCSI drivers.** Each storage device you add to the server's internal drive should use the same SCSI driver. Driver-level conflicts caused by devices from several vendors can destroy data. More important, make sure the SCSI driver you choose is current and compatible with your Mac OS version. In general, you should use the SCSI driver that ships with the Mac OS and is installed and/or updated using the Apple HD SC Setup application or Drive Setup application.

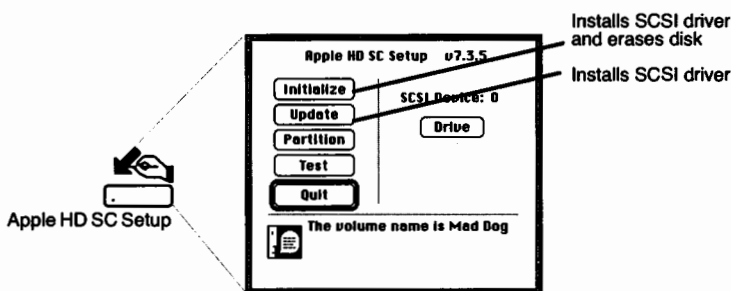
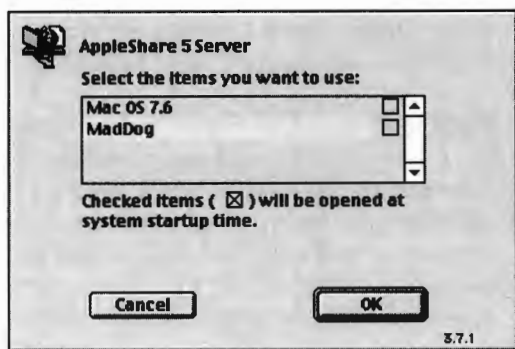


FIGURE 3-2: Using Apple HD SC Setup.

**Uniquely name the hard drives.** A new Macintosh computer's hard drive is named "Macintosh HD." A newly formatted Macintosh computer's hard drive is named "untitled." You should choose more original and descriptive names for all hard disks installed on your Macintosh server because, should you decide to share an entire drive on the network, this is the name that users will see when they log in through the Chooser. In the illustration below, for example, "Mac OS 7.6" is a CD-ROM while "Mad Dog" is a hard drive. ("Mad Dog" was one of AppleShare IP's pre-release code names.)



Uniquely naming the hard drives will help to prevent confusion and is especially helpful when users create server volume aliases. They cannot have two aliases called "Macintosh HD alias" even if each represents a hard drive on a different server.

A disk name can have a maximum of 27 characters and cannot contain a colon or begin with a period. It should not contain any special characters or spaces if the server will be using FTP, since some FTP clients have trouble with these. For that reason, "Mad Dog" should become "Mad-Dog."

## FINDING A PLACE FOR YOUR SERVER

Your AppleShare IP server will probably be the most important single piece of equipment in your office. Just think what would happen if the hardware were destroyed or stolen while in operation. For many administrators, this would mean the loss of files, Web server, mail server, and back-up drive all at once!



---

*FIGURE 3-3: A great example of a server room can be found at Chartwell Partners International in San Francisco, under the care of Sheryl Coryell. It is spacious, clean, cool, earthquake resistant, and secure from intruders.*

Because of its importance, your server should be in a place that is as secure as possible. The best place is a dedicated “server room,” but other locations may do equally well if they meet the following criteria:

1. The location should contain a strong and stable shelf or table on which to place the server. The server should then be held down with specially designed clamps or even bungee cords to prevent its being easily stolen, knocked over by a passerby, or shaken off by an earthquake. Do not put the server on the floor, especially if the floor may be vulnerable to flooding.

I recommend that you use one of the specially constructed racks available for storing servers compactly and securely. Find one on wheels so that you can move it around and get behind the server

when you need to attach and detach cables. In addition, use the specially designed Macintosh security products (from Kensington, among others) to lock your server down. If space is a problem and you have multiple servers, try a peripheral switch box that permits multiple servers to share one monitor and keyboard.



---

FIGURE 3-4: *Bracing for disaster.*

2. The location should be insulated from extremes of temperature and humidity. Most computers are designed to operate in temperatures between 50 and 95 degrees Fahrenheit and a relative humidity between 20 and 80 percent. If you cannot control the environment of the entire room, there are several specially designed server closets on the market that have their own built-in environmental controls.
3. The location should have an adequate and reliable power supply. You will not want to put your server next to a large copier or laser printer, or any other device likely to draw excessive power on the same circuit. In addition, always install an Uninterruptible Power Supply (UPS) to ensure that your server gets neither too much nor

too little power. Either situation can damage a computer. A UPS also keeps the server running long enough during a power outage so that you can shut it down gracefully.

4. The location should not be near an electromagnetic field source. Large appliances in particular emit electromagnetic radiation that interferes with cabling signals and magnetic media. Do not put the server next to an air conditioning unit, refrigerator, elevator, etc.
5. The location should be clean. Dust can accumulate inside the machine and eventually cause electrical shorts and even fires. Cigarette smoke also damages computers.
6. The location should be locked. At the very least, it should be inaccessible to the general public. Be wary of outsiders who may attempt to snoop or even steal the server to obtain its data. Do not leave backup tapes lying about either. Stealing a backup tape is even easier than stealing a poorly guarded server. (If you use Retrospect, employ its data encryption feature to make stolen tapes worthless to the thief.) Finally, use a screen saver utility that locks the screen and keyboard under a password after a certain amount of idle time has elapsed.

If you are particularly concerned about unauthorized persons gaining access to sensitive data on your server, you can manage it as a “headless” machine. Under this scenario, you remove the server’s monitor, keyboard, and mouse so that it cannot be controlled locally. You can then use remote management utilities to control the server over its network connection.

Perhaps the single most useful remote access utility is Timbuktu Pro from Farallon Computing, Inc. With this application you can open a window on your computer that displays the screen of the remote server. You can use your computer’s keyboard and mouse to control the server over the network just as you would if you were standing in front of it.



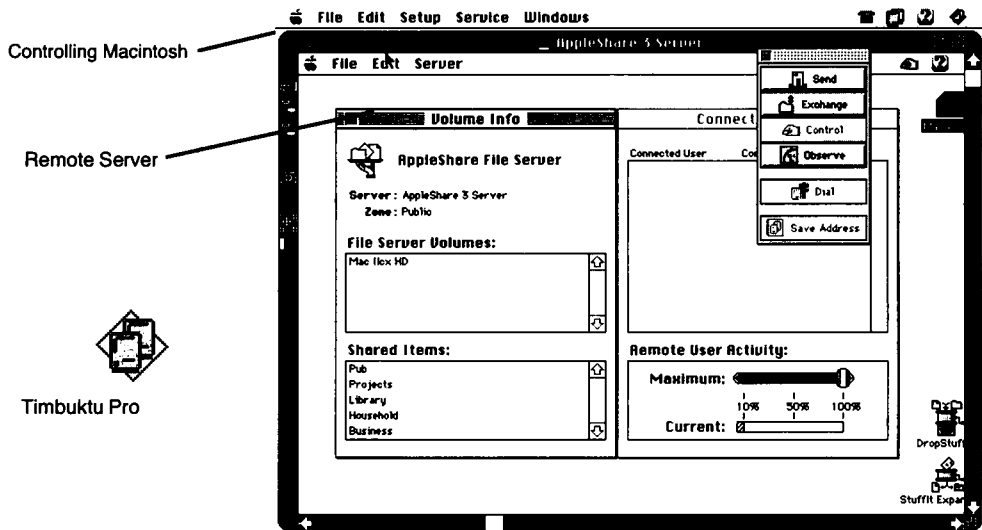


FIGURE 3-5: Controlling a server with Farallon's Timbuktu Pro.

Timbuktu Pro works over TCP/IP and ARA as well as AppleTalk and Novell NetWare, so it can be used to control servers from great distances.

In addition to Timbuktu Pro, which gives you remote access to the server Macintosh's functions, another powerful utility is Santorini Consulting & Design, Inc.'s Server Manager, which gives you remote access to all of the functions of AppleShare. This application is the subject of Chapter 9.

## CONNECTING THE SERVER TO THE NETWORK

As important a decision as where to locate the server Macintosh in a building is where on the LAN it should be placed. To do this, you will need to know something about your network's design.

## Connecting the Server to a Network

Figure 3-6 displays a typical *internetwork*, which is defined as multiple network *segments* connected by *routers*. Networks can be segmented to reduce overall traffic as the number of computers they support increases. A Macintosh on Segment B does not need to “hear” the interaction between two Macintosh computers on Segment A. Thanks to the router, it will not. The router only permits traffic that is destined for a Macintosh on Segment B to pass to Segment B.

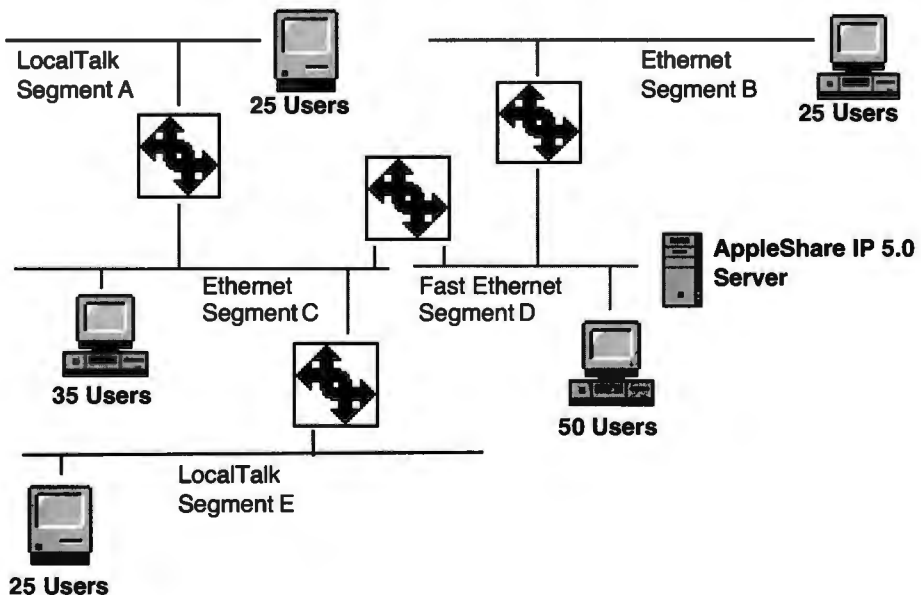


FIGURE 3-6: AppleShare IP server placement.

In Figure 3-6 I have chosen to place the AppleShare IP server on the Fast Ethernet Segment D for two reasons. First, this segment has both the greatest number of users and the highest available bandwidth (100 Mbps). Second, it is in the middle of the internetwork, with no one segment being more than two router *hops* away from the server.

I might have put the server on Ethernet Segment C, which is also in the middle of the internetwork. However, this is a 10-Mbps segment, so there is not as much bandwidth available to AppleShare IP and its clients here.

I would not put the server on Ethernet Segment B because it would be resident on a slower segment and would also be three router hops away from the LocalTalk segments. I would absolutely not put the server on either LocalTalk segment. It would then be three hops away from some of the other network segments and on a cabling scheme that is 44 times slower than already slow 10-Mbps Ethernet!

If you do not have routers on your network, this point is largely moot. If you do them but are uncertain about the network's overall design, you can use a specialized application from Neon Software, Inc., called LANsurveyor to draw a logical map of all the devices and segments on your LAN. This application makes planning service deployment easier and is invaluable in network troubleshooting.

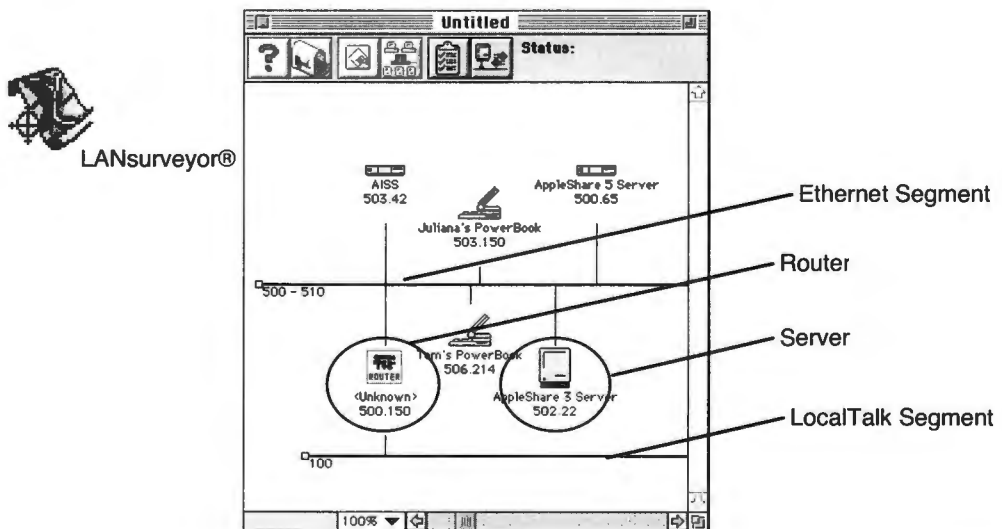


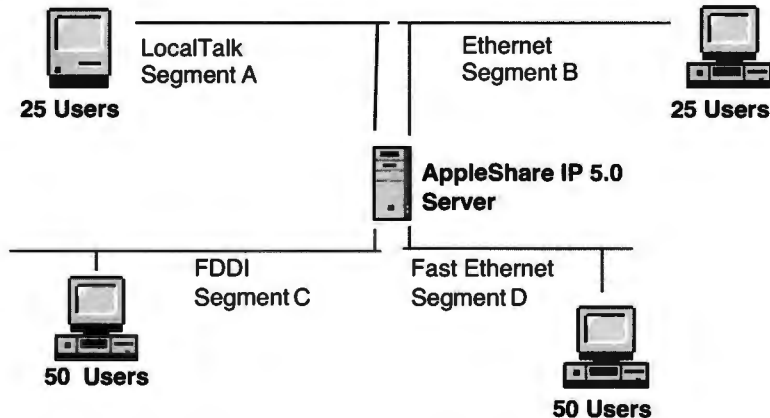
FIGURE 3-7: Mapping your network with LANsurveyor.

If you find yourself asking "What is a segment?," "What is a router?," or "What is a hop?," I recommend that you buy a copy of *Designing AppleTalk Network Architectures* by Dorian J. Cougias, Tom Dell, and E. L. Heiberger (AP PROFESSIONAL, 1996).

## Connecting the Server to Multiple Networks

The server deployment method I have just described uses conventional wisdom. Since the advent of AppleShare 4.2, however, another option has become available with the introduction of *multihoming*.

Using multihoming, a server can provide AppleShare service to as many as four network segments from a single server. In Figure 3–8, I show an AppleShare IP server configured to do this with one network segment connected through its built-in Ethernet port, another connected through its built-in LocalTalk port (e.g., the Printer port or the Modem port), and two more segments of different types (Fast Ethernet and Fiber Distributed Data Interface, or FDDI) connected through network interface expansion cards. Macintosh clients on all four segments are thus able to log in to the AppleShare IP Web & File Server.



---

FIGURE 3–8: AppleShare IP server placement for multihoming.

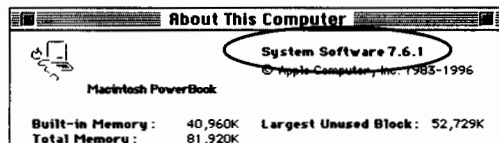
As with routers, multihoming can reduce overall network traffic by distributing it across multiple network segments. It can therefore significantly increase the speed with which clients interact with the server. Unlike with routers, however, users on the different network segments cannot access each other's Macintosh computers for Personal File Sharing or use each other's networked printers.

A router may also act as a *firewall*, which blocks certain types of traffic between networks and/or network segments. Most commonly it is used to block Internet users from accessing services on a LAN while permitting them to access a Web server. If a firewall is part of your network design and you will be using AppleShare IP Web & File Server to share information with Internet users, other factors come into play with regard to server placement. These will be discussed later.

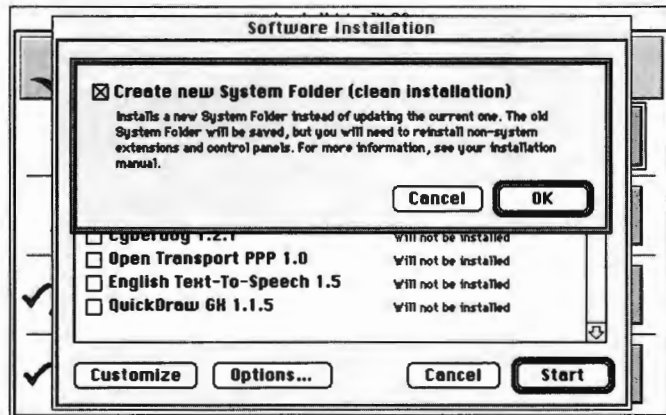
Multihoming has some limitations as currently implemented. It is only supported on PCI-based, not NuBus-based, Macintosh computers. In addition, it works only with AppleTalk, not TCP/IP.

## INSTALLING APPLESHARE IP

AppleShare IP requires System 7.6 or later and Open Transport 1.1.2 or above. Make sure that your server Macintosh meets these requirements before you proceed. You can determine which version of the Mac OS your computer is using by looking in the **About This Computer** window.

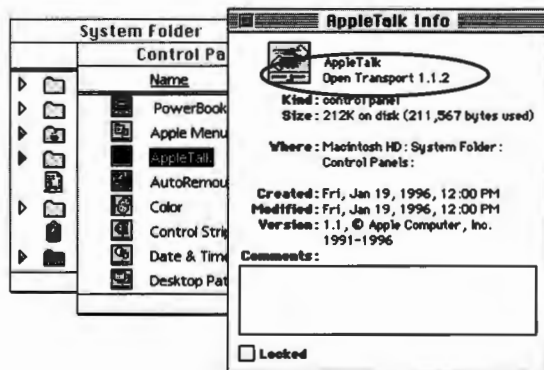


If you do not have System 7.6 or later running on the server Macintosh, you will need to install it in a new System Folder. This is called a “clean install” because it uses none of the components of the old System Folder. Use the **Options** button in the Mac OS Installer application’s Software Installation window to specify a clean installation.



After rebooting the Macintosh, restore the Users & Groups Data File from your backup.

You can find out which version of Open Transport the Macintosh is running by selecting the AppleTalk control panel inside the Control Panels folder of the System Folder, and then choosing the **Get Info** command under the **File** menu bar item.

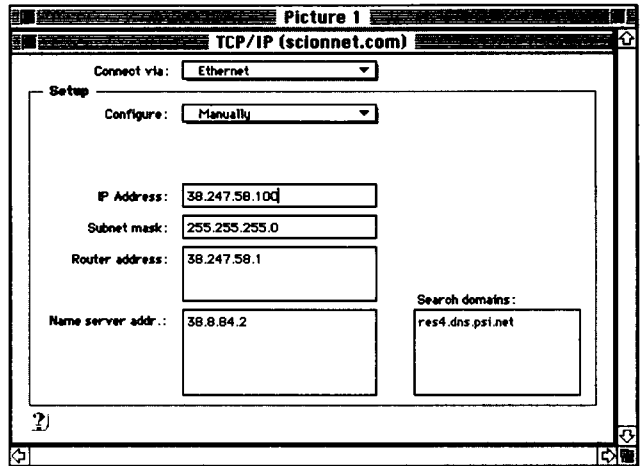


If you must upgrade from an earlier version of Open Transport, first copy down any settings that are in the TCP/IP control panel. The easiest way to do this is to open the TCP/IP control panel and then press the **shift-command-4** key combination while the **caps lock** key is down to take a

snapshot of it. This file, saved as “Picture 1,” can later be opened using SimpleText.



Picture 1

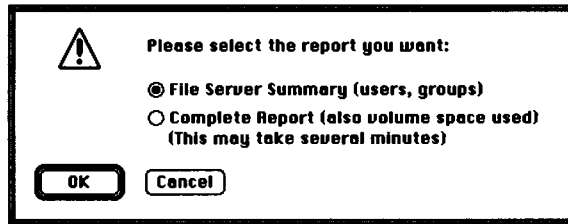


Before you run the AppleShare IP installer on a new Macintosh server, you must configure your computer’s Sharing Setup, AppleTalk, and TCP/IP control panels. If you are upgrading from AppleShare 3.x, or 4.x, or from Personal File Sharing, these steps may have been done already. You may skip ahead to installing the software.

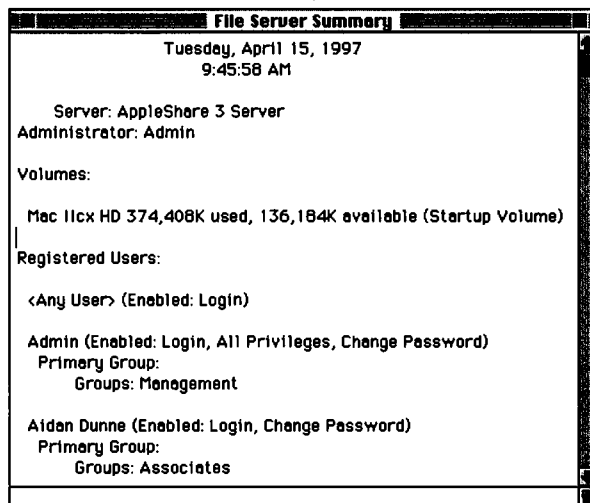
## If You Are Upgrading AppleShare

When you upgrade from an earlier version of AppleShare, your user and group accounts are retained and their access privileges are converted to new AppleShare IP access privileges. In some cases the old and new privileges are not compatible, in which case AppleShare will translate the old privileges to the closest match that provides the most security.

Before you upgrade, it is a good idea to generate a File Server Report from AppleShare 3.x or 4.x so that you will have something to work with if problems arise during the translation. Do this by choosing the **File Server Report** command under the **Server** menu bar item in AppleShare Admin.



In the dialog box that opens, choose the **File Server Summary** button; then press the **OK** button. AppleShare Admin will create a text file containing user, group, and privilege information.



---

*FIGURE 3–9: AppleShare 3.x/4.x File Server Summary.*

When you upgrade from a previous version of AppleShare Print Server, its setup is not retained. You will have to re-create its print queues.

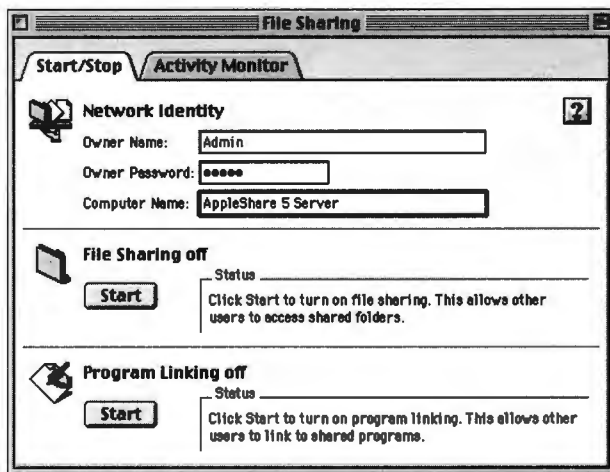
When you upgrade from Personal File Sharing, user and group accounts are retained but new access privileges must be set.



If you need to restore an AppleShare 3.x or 4.x server from a Retrospect backup, or if you are migrating files from an older Macintosh to a new server, refer to the Special Circumstances section at the end of this chapter.

## Configure the Sharing Setup

In the **Owner Name** of the Sharing Setup control panel, type your name. If others besides you will manage this server, you might use a generic name to represent an Administrator's account, such as "Admin."



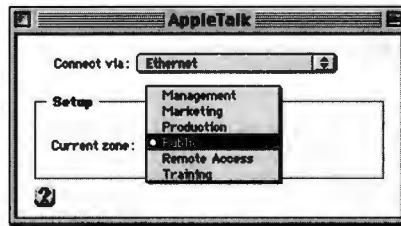
Type a password in the **Owner Password** field. It can be up to eight characters long and is case-sensitive.

Finally, type a name for the server in the **Computer Name** field (e.g., "AppleShare 5 Server"). It can be up to 31 characters long and must not contain a colon. It must also be different from any other AppleTalk service on your network or there will be addressing conflicts when users try to select it in the Chooser.

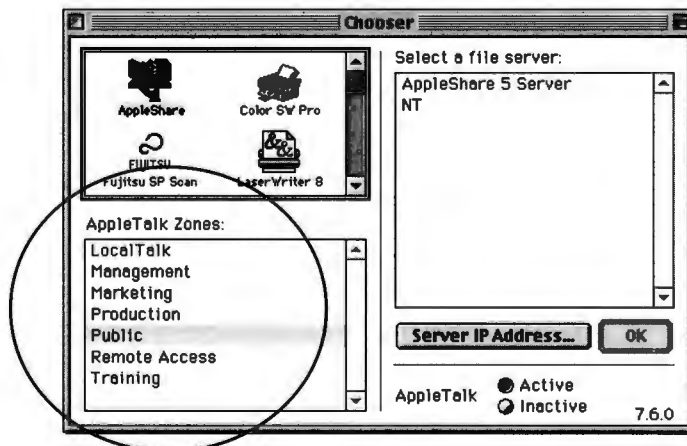
AppleShare IP will use the information you entered here. It can be changed thereafter with the AppleShare IP Web & File Admin program.

## Configure AppleTalk

To configure AppleTalk on the server Macintosh, open the AppleTalk control panel. Here, choose the interface type for the network on which you wish to make AppleShare available. To do this, go to the **Connect via** pop-up menu. If your network has routers, choose the **zone** in which the server should appear (if there are any) in the **Current zone** pop-up menu.



Do not confuse network zones with the network *segments* I mentioned earlier. Multiple zones can exist on any given segment, depending on how your network was designed and your routers were set up. They are used to logically group AppleTalk devices in the Chooser for users' convenience. You might have an "Ethernet" zone and a "LocalTalk" zone, for instance. You might have zones for various floors in your building or for different departments. When there are many devices on the LAN, zones make them easier to locate.



If you do not have a router on your network, you will not have zones. You may have them if you do have a router.

If you have a PCI-based Macintosh server, you can make it appear in as many as four different zones at the same time by using multihoming. If you want to do this, refer to the description of multihoming in the next chapter.

## Configure TCP/IP

Assuming that you plan to use the new IP services made available through AppleShare IP, you will need to configure the TCP/IP control panel. How you do this will vary depending on whether or not your server will have access to the Internet. If not, it will need to be configured to work on an *Intranet*.

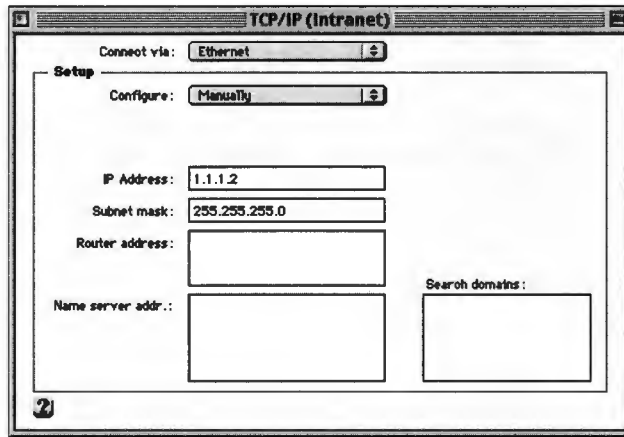
The most widely accepted definition of an Intranet is a LAN that takes advantage of the same technologies used on the World Wide Web. It is a LAN that uses TCP/IP, Web servers, and computers equipped with browsers, but it is not necessarily connected to the Internet.

In order to use the Internet or an Intranet, each Macintosh must be given its own unique number, or IP address. If your network is connected to the Internet, these numbers must be unique throughout the world, so they are assigned by a central authority, the InterNIC. However, if your network is not connected to the Internet, you can simply make these numbers up.

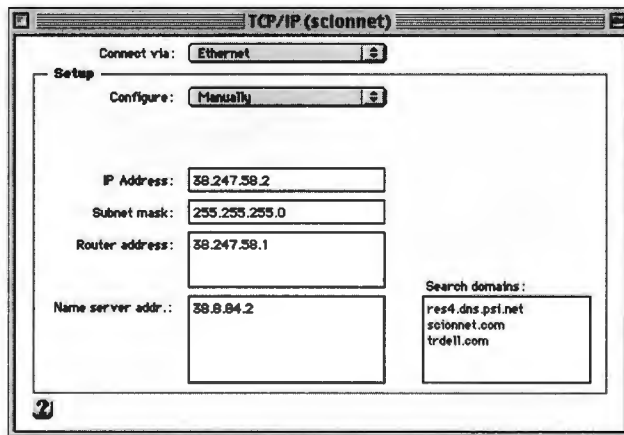
A valid IP address contains four places, each of which must contain a number between 1 and 255 in the format "0.0.0.0." If your network is connected to the Internet, these addresses will be supplied to you by your Internet Service Provider (ISP). On an Intranet, you can make up whatever numbers you want within these basic parameters. You can build an Intranet by giving the first computer on the network a number such as "1.1.1.1," the next "1.1.1.2," and so on, until you reach "1.1.1.255."

To set up your server to work on an Intranet, open the TCP/IP control panel from the **Control Panels** item under the **Apple ()** menu bar item.

Here, choose **Ethernet** in the **Connect via** pop-up menu and **Manually** in the **Configure** pop-up menu. (LocalTalk cannot be used.) In the **IP Address** field, type the machine's unique address (e.g., 1.1.1.2). In the **Subnet mask** field type "255.255.255.0."



To set up your server to work on the Internet, type the machine's unique address as provided by your ISP in the **IP Address** field. Your ISP should also be able to provide you with the number that should go into the **Subnet mask** field, or you might have to get this from whoever configured your IP router.



The unique number associated with your IP router must be typed into the **Router address** field. The address(es) of your ISP's domain name server(s) must be typed into the **Name server addr** field. Your organization's domain name (e.g., "apple.com," "apnet.com," "scionnet.com") is entered in the **Search domains** field.

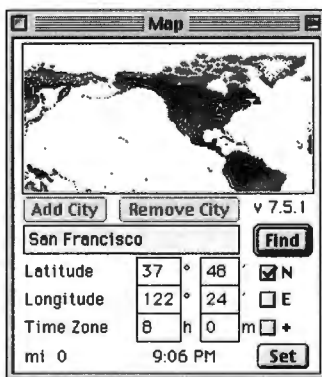
When you close the window, you will be asked if you wish to save the changes to the configuration. Press the **Save** button.

I will explain IP addressing and domain names briefly in later chapters. For a comprehensive explanation I recommend *TCP/IP Clearly Explained*, second edition, by Peter Loshin (AP PROFESSIONAL, 1997).

## Configure Date & Time

To ensure that all AppleShare logs and email are marked with the correct times, see to it that the server Macintosh is configured with the correct time zone and an accurate clock.

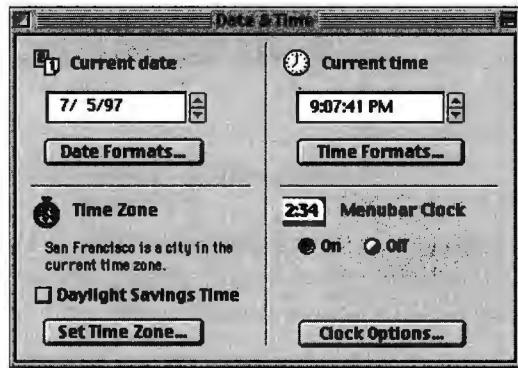
First, open the Map control panel. Type the name of the city nearest you in the field next to the **Find** button and then press the **Find** button.



The Macintosh will look up your city's global position and time zone (relative to Greenwich Mean Time). Next, press the **Set** button.

If the Macintosh does not know where your city is, show it by clicking on the appropriate spot on the map. Next, type your location's name in the field next to the **Find** button and press the **Add City** button.

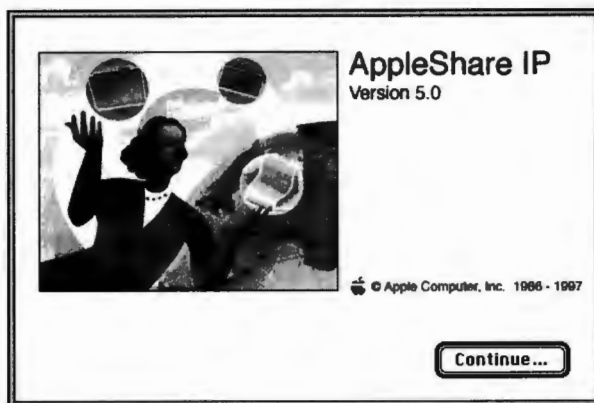
Although this will tell the server where the time zone is, it still might not know what time it really is. Set this in the Date & Time control panel.



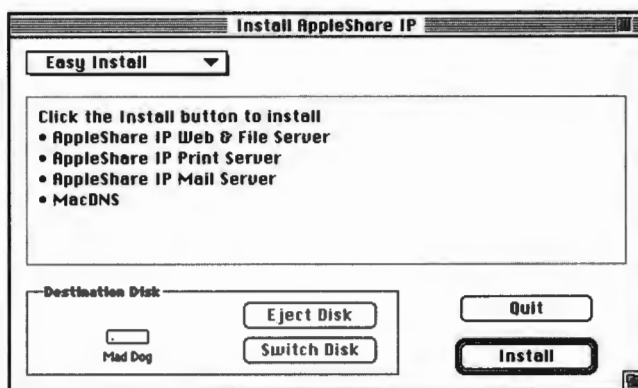
## Run the Installer

After you have configured all of your server's system software components, you may install AppleShare IP by launching the "Install AppleShare IP" document on the installation CD-ROM.

When you launch it, you will be presented with a welcome screen.



After you press the **Continue** button to leave this screen, you will be presented with a window displaying the license agreement. Next, you will arrive at the Install AppleShare IP window.



Because AppleShare IP is a collection of components rather than one application, you can choose which services to install. Select the **Custom Install** option in the pop-up menu in the window's upper left corner. (For my purposes here I'll stick with the **Easy Install** option and just press the **Install** button. That will install everything.)

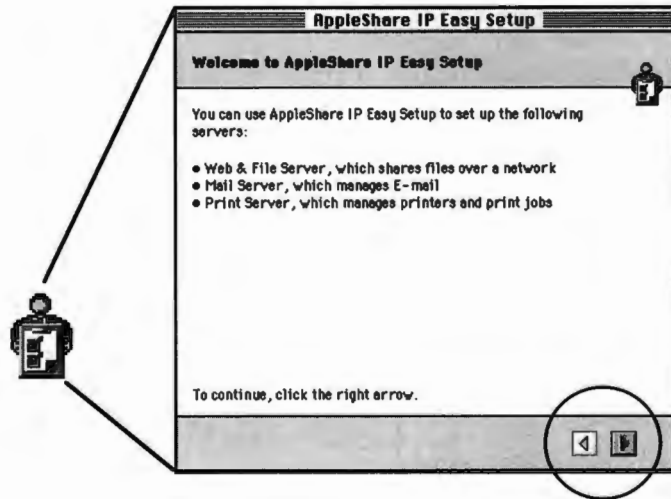
If you have multiple hard drives on your server, make sure that the installer has targeted the correct one in the Destination Disk pane. If not, press the **Switch Disk** button until the correct hard drive is displayed.

The Installer script will put all the necessary software in the correct places on the server's Startup Disk, then prompt you to restart the Macintosh. After the Macintosh restarts, you will see that an "AppleShare IP" folder and a "Web Folder" have been installed on the hard drive.

## Run Easy Setup

Open the "AppleShare IP 5.0" folder to continue. In this folder you will find the AppleShare IP Easy Setup application. Launch it.

This application will take you through the process of setting up AppleShare IP in several screens that you can navigate by using the arrow buttons in the lower right corner.



Whether you are installing AppleShare IP on a new server or are upgrading from a previous version of AppleShare, you must run this application. Press the rightmost arrow button to advance from the welcome screen. Next, you will be confronted with your first choice—"normal" or "custom" setup.





As a rule, if your network is connected to the Internet, choose the **Normal** button. If it is not, choose the **Custom** button. If you choose the custom option, you will need to configure MacDNS as described in Chapter 11. Press the rightmost arrow button to proceed.

Next, you will be prompted to enter your software's serial number. If you are upgrading AppleShare, your previous serial number will appear.



Keep this number in a safe place in case you ever need to install AppleShare IP again. Press the rightmost arrow button to advance.

The next window is used to launch the initialization process.

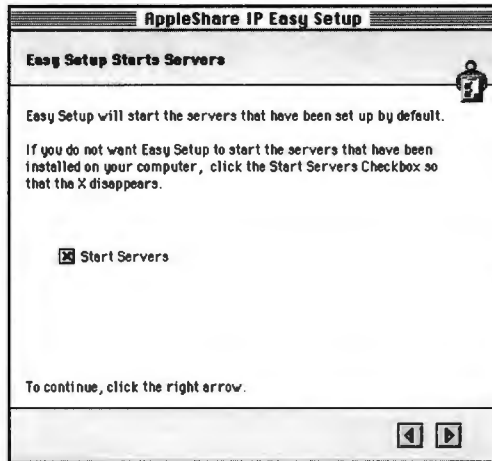


Press the **Set Up Servers** button here. If all is well with AppleShare IP's various components, you will be rewarded with the following dialog box:



Press **OK** to dismiss it. Now the **Set Up Servers** button will be grayed out. Press the arrow button to advance.

Next, you may decide whether or not AppleShare's servers should start up automatically after setup.

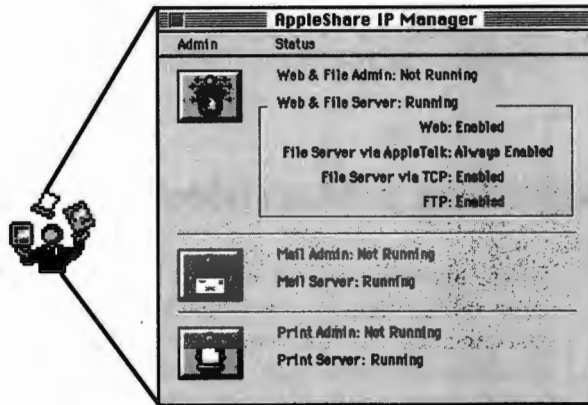


If you do not enable the **Start Servers** check box, you will need to launch each server manually. Press the arrow button to advance.

You may either quit the application at this point or launch AppleShare IP for the first time by pressing the **Start Manager** button.



After AppleShare IP launches, you will be presented with the AppleShare IP Manager application's main window.



This window serves two purposes. First, it indicates the status of four of AppleShare IP's component servers. Second, it gives you buttons that will launch the administration programs for each server. I will cover each server in the following chapters.

## One More Time . . .

Before you consider this phase of your work complete, I strongly recommend that you back up the new server hard drive again. This time, however, you can do it using the same media that will begin the server's rotational daily backup routine. I will show you how to set this up in the next chapter.

For extra security, you might create another milestone backup as well.

## SPECIAL CIRCUMSTANCES

In the previous section I illustrated the typical process of installing AppleShare IP on a new Macintosh server. Read this section if you are

migrating the shared volumes from an older server to a new one. If you are configuring your server for use on an Intranet only, also refer to Chapter 11's description of MacDNS.

## Upgrading a Macintosh Server

There are two ways to migrate an older installation of AppleShare to a new server. One way is to back up the original server using a software package such as Retrospect, then restore it to the hard drive of the new machine. The other way is to hook up an external hard drive to the older server, then use AppleShare Admin to copy its shared volumes in such a way as to preserve their privileges. You can then attach the external hard drive to the new server and move over the old folders using AppleShare IP Web & File Admin.

### Restoring a Hard Drive with Retrospect

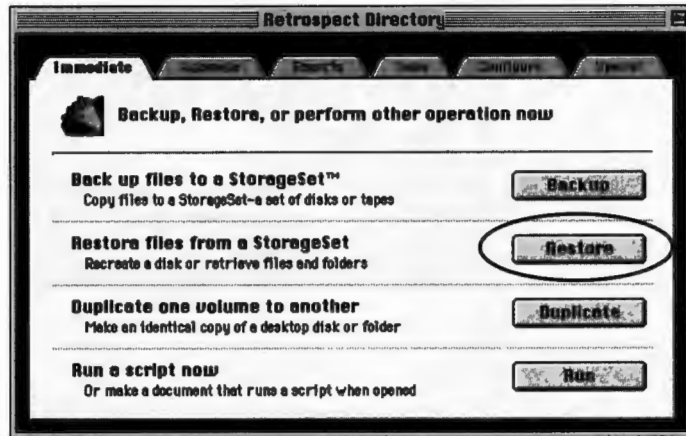
To use a Retrospect backup to restore folders and files to a new or newly formatted server hard drive, follow this procedure.

First, make sure that the hard drive to which you will be restoring files is an active Startup Disk (e.g., it has a System Folder on it). As I described earlier, this must be a "clean" System Folder created by Mac OS System 7.6 or later and containing Open Transport 1.1.2 or later. You must also install AppleShare IP.

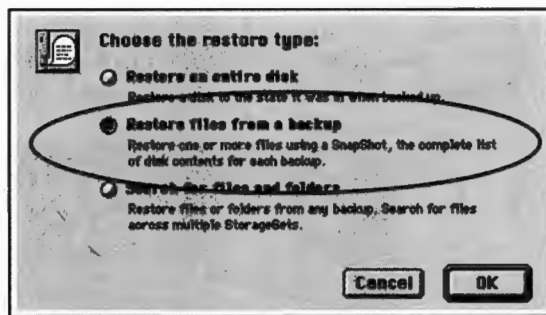
Next, install Retrospect on this hard drive.

If you backed up the catalog file to a floppy diskette as I suggested, copy it to the new hard drive as well. If you did not, consult the Retrospect manual for instructions on how to rebuild a StorageSet catalog.

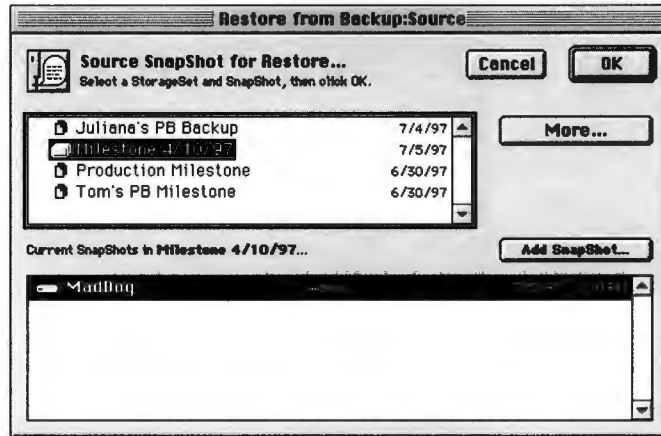
***Restore the Users & Groups Data File.*** Next, insert the DAT (or other medium) in the backup drive and launch Retrospect.



In the Retrospect Directory window that appears, press the **Restore** button under the **Immediate** tab. This will open a dialog box in which you must choose a restoration method from three options.

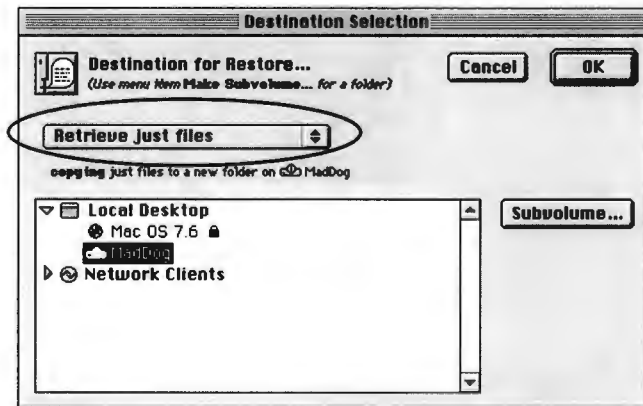


Do not choose to restore the entire disk. That would overwrite your new System Folder. Instead, restore only files from the latest backup.

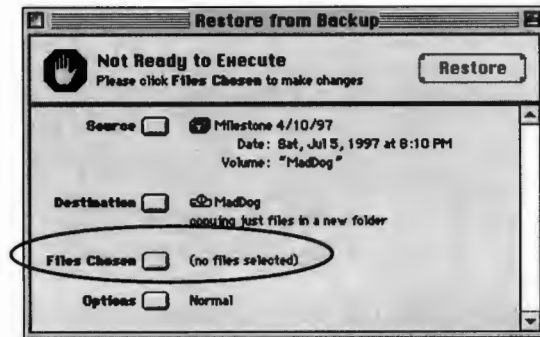


Next, you will be asked to identify which Retrospect SnapShot within the StorageSet contains the files you seek. If you followed my directions for a milestone backup, there should be only one. Highlight it and press the OK button.

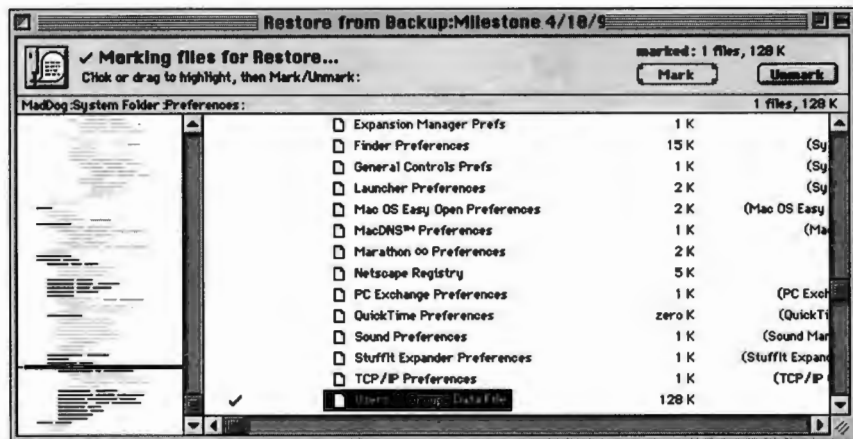
Retrospect will then ask you how much of its backed-up data you want to restore and where it should put it. Choose the new hard drive, select **Retrieve just files** in the pop-up menu, and then press the OK button.



The last thing you have to tell Retrospect is which files you wish to restore. Press the **Files Chosen** button.

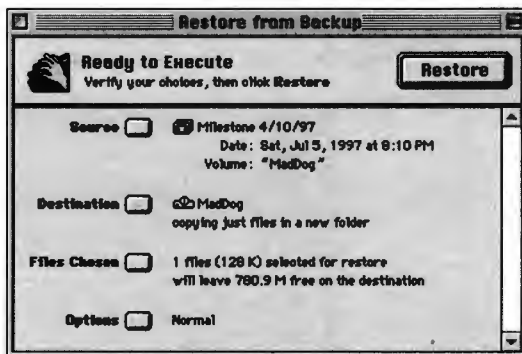


Initially, you should restore only the Users & Groups Data File, which you will find in the Preferences folder within the System Folder. Highlight this single file, then press the **Mark** button to select it.

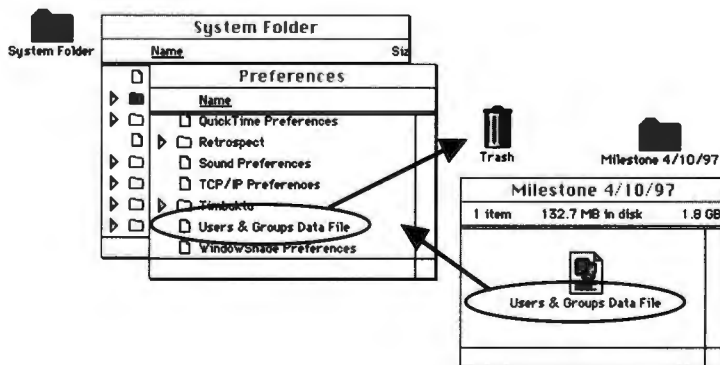


When you close this window, the **Restore** button will be enabled in the Restore from Backup window and the Users & Groups Data File will be listed by the **Files Chosen** button. Press the **Restore** button to proceed.





Retrospect will create a folder named after the StorageSet on the new hard drive and install the new file in it. You will then need to swap the Users & Groups Data File AppleShare IP created during installation with this older one. Drag the new Users & Groups Data File from the Preferences folder within the System Folder to the Trash, then drag the older Users & Groups Data File into the Preferences folder.



Now restart the computer.

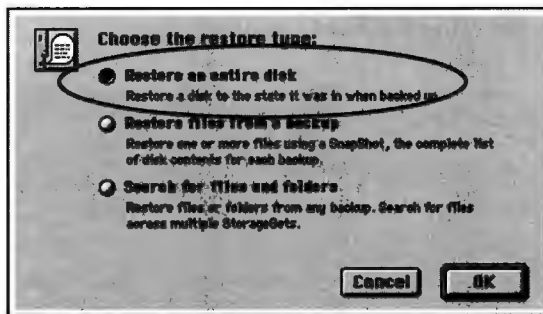
**Restore shared volumes.** After the server Macintosh is booted, launch AppleShare IP and run Easy Setup. This will convert the privileges stored in the old Users & Groups Data File to a format that is compatible with the new AppleShare IP.

Once AppleShare IP is running you will need perform two administrative functions.

1. Go into AppleShare IP Web & File Server Admin's Users & Groups List to verify that your old accounts were properly transferred.
2. Create and share the same top-level folders that were shared volumes on your AppleShare 3.x/4.x server.

Unless you already know how to do this, skip ahead to the next chapter and read about shared volumes before proceeding further here.

Once you have your shared volumes re-established, you will need to run Retrospect again. Press the **Restore** button under the **Immediate** tab in the Retrospect Directory window. This will open the dialog box in which you must choose a restoration method.

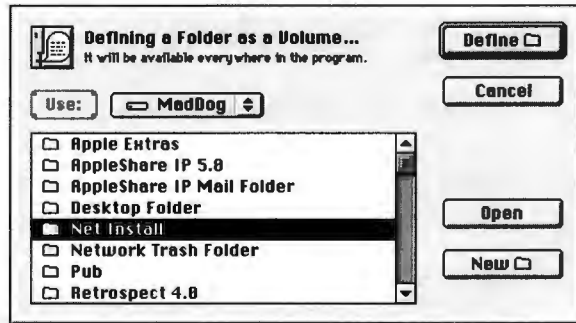


This time *do* choose to restore the entire disk.

You will again be asked to identify which Retrospect SnapShot within the StorageSet contains the files you seek. Highlight the milestone backup and press the OK button.

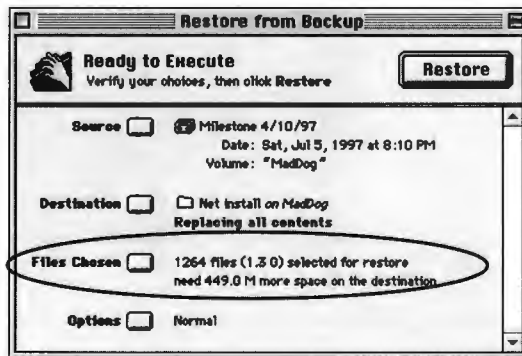
Once more, Retrospect will want to know how much of its backed-up data you want to restore and where it should put it. Choose the new hard drive as before, but this time select **Restore an entire disk** in the pop-up menu and then press the **Subvolume** button to continue.

In the Define Subvolume window, select one of the new server's shared volumes and press the **Define** button.

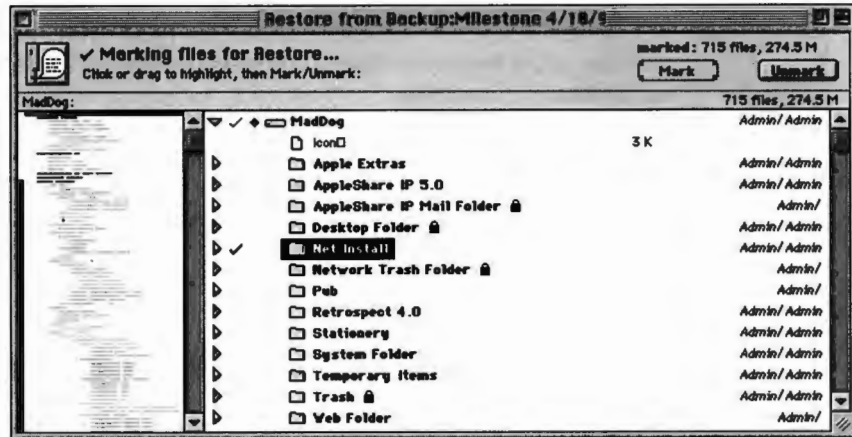


After you are returned to the Destination Selection window, press the **OK** button. You may safely dismiss the warning dialog box that this generates.

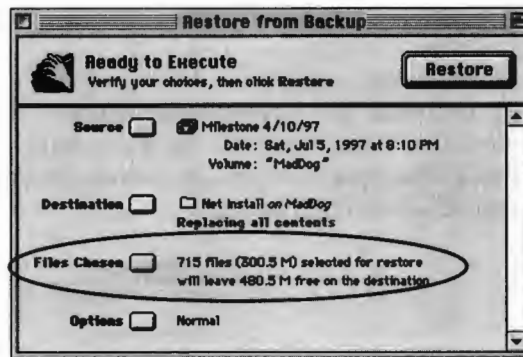
Finally, you must again tell Retrospect which files you wish to restore by pressing the **Files Chosen** button.



As it stands now, this is all of the folders and files, but you do not want that. Instead, you want just the shared volume whose namesake is the same as the Destination subvolume. Find it and mark it.



When you close this window, the **Restore** button will be enabled in the Restore from Backup window and the contents of the old shared volume will be listed by the **Files Chosen** button. Press the **Restore** button to proceed.



Retrospect will now install the proper folders and files into the appropriate shared volume while maintaining the correct account privileges.

Repeat this procedure for each shared volume.

**Restore everything else.** You can repeat the first procedure to restore all nonshared folders and files to the new server. Retrospect will

restore all of the folders and files from the previous server, including the old System Folder, in a folder on the new hard drive. Drag all of the folders except the System Folder and previous shared folders to the top level of the new server drive.

Be careful about replacing new folders with old folders that have the same names. In most cases, such as with “Apple Extras,” you will want to keep the newer files. The Mac OS will warn you if you are about to do this. When you are finished, throw away the restored files folder.

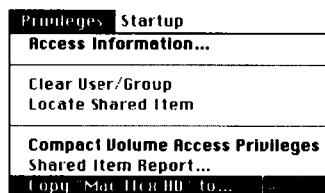
## Copying Shared Volumes with AppleShare

If you cannot use Retrospect to move volumes from an older server to a newer one, you can use an external hard drive to do so.

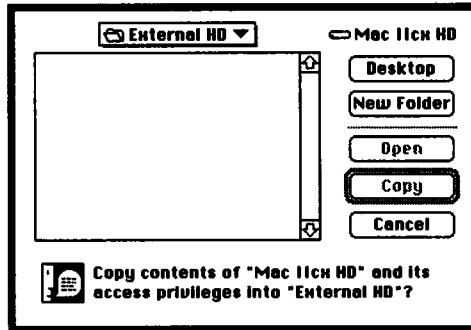
First, attach an external hard drive of equal or greater volume than that of the originating server Macintosh to its SCSI chain, then restart it.

After you have booted the AppleShare 3.x or 4.x server, make sure that the AppleShare File Server application is not running. Next, launch AppleShare Admin.

From within AppleShare Admin, open the Access Information window by choosing the **Access Information** command under the **Privileges** menu bar item. This will make a couple of options available under the **Privileges** menu bar item, including the **Copy (name of volume) to** command. Select this command.



AppleShare Admin will ask you for the destination of the shared volumes, which should be the external hard drive.



Press the **Copy** button to duplicate the volumes (along with their associated privileges) on the external hard drive.

Once you have copied all of the shared volumes that you wish to migrate to the external hard drive, attach the hard drive to the new server Macintosh. After rebooting, copy the old Users & Groups Data File to the server's startup disk. Then you need only run the AppleShare IP Easy Setup to start sharing the volumes on the external hard drive with the new server.

If you want to share the volumes from the new server's Startup Disk instead of from the external hard drive, do not simply copy them over in the Finder. If you do, privilege information will be lost. Instead, use the **Duplicate Folder** command under the **Server** menu bar item in AppleShare IP Web & File Admin to copy them over. This command is available when the Web & File Server is running.

## SUMMARY

When you install a new Macintosh server you must perform several steps in sequence: First, install any supplemental hardware on the CPU; second, place the server computer in a secure place; third, deploy your

server on the network at a location most accessible to your users; and finally, run AppleShare IP Easy Setup to install the server software.

When you upgrade an older AppleShare server, or migrate server volumes from one machine to another, you must back up or duplicate its shared volumes in such a way as to preserve their privileges.

Always perform a full backup of the server's hard drive before and after you install server hardware or software.

# 4

## AppleShare IP File Server

As you have seen in the last two chapters, dedicated AppleShare servers differ from ordinary Mac OS desktop computers in their faster processors, larger storage media, faster I/O buses, and optimized network connections. Interaction between this kind of file server and a workstation is a typical example of the client-server networking model in action.

Since the advent of System 7, AppleShare technology has enabled any Mac OS desktop computer to be a nondedicated file server as well. Using Personal File Sharing—sort of an “AppleShare Lite”—a Mac OS workstation may serve files to other computers while acting as a client to dedicated AppleShare servers. Although Personal File Sharing also adheres to the client-server model, it is most often described in terms of peer-to-peer networking.



Practically speaking, a Mac OS computer running the AppleShare File Server application is usually dedicated to sharing files and services with other computers, whereas one running Personal File Sharing is usually dedicated to other tasks. Mac OS workstations are seldom used exclusively as file servers because Personal File Sharing is about 10 times slower than AppleShare File Server and supports far fewer users. In addition, processor performance can degrade noticeably on a Mac OS workstation that has Personal File Sharing enabled.

Under AppleShare, the AppleTalk Filing Protocol (AFP) is used for communication between a Mac OS client and a Mac OS server. It is possible to use it on other machines, although not common.

AppleShare IP 5.x also has the ability to transfer files with AFP. In addition, it can move files using the Internet's File Transfer Protocol (FTP) and HyperText Transfer Protocol (HTTP). Since these TCP/IP protocols can be used by most of the world's networked computers, AppleShare IP's new capabilities greatly extend its reach into a heterogeneous computing environment.

Although AppleShare IP's file server and Web server are both configured and managed by the same Web & File Server Admin application, I will concentrate on just the file server and its issues here. The Web server and its special characteristics will be discussed in the following chapter.

## HOW APPLESHARE WORKS

AppleShare is an integral part of AppleTalk, the Mac OS communications protocol. Like many other networking languages, AppleTalk is based on the Open Systems Interconnection (OSI) reference model created by the International Standards Organization (ISO) way back in 1970.

## AppleShare in the OSI Model

The OSI model comprises seven layers, each of which provides an abstract way of representing the specific components that enable communications on a network. These layers break down as follows.

### Application Layer

At Layer 7, the languages and syntax that programs use to communicate with each other are defined. Most of the commands needed to open, read, write, transfer, and close files over the network are exchanged at this level.

### Presentation Layer

The encoding of data so that it can be exchanged between different computer systems is managed at Layer 6. In security applications, for example, encryption and decryption are handled here.

### Session Layer

Layer 5's job is to maintain an orderly process of communications. Among the things that are determined here are whether or not communications will be one-way (half duplex) or two-way (full duplex) and how that dialog will be managed so that it can be recovered in the event of a connection failure.

### Transport Layer

Layer 4 maintains the integrity of a transmission overall. If a 1-Mbyte file is sent from a server, Layer 4 ensures that an identical 1-Mbyte file is received by a workstation.

## Network Layer

At Layer 3, the route over which the sending and receiving computers will communicate is established. Where a network is segmented, as shown in the last chapter, these routes can become quite complicated as data hops across routers.

## Data Link Layer

The division of data bits into frames for node-to-node transmission takes place at Layer 2. A process of error checking and retransmission ensures that all the necessary data is eventually transferred, even if a few frames go AWOL in Cyberspace.

## Physical Layer

Layer 1 handles the electrical and mechanical signaling that moves data bits from one computer to another. While this usually takes place over wires, Infrared or Radio Frequency (RF) transmission can also be used.



---

*Note: The mnemonic phrase that helps me remember these layers, from bottom to top, is "People Don't Need Those Stupid Protocols Anyway."*

---

AppleTalk protocols correspond closely to most of these layers, as shown in Figure 4-1.

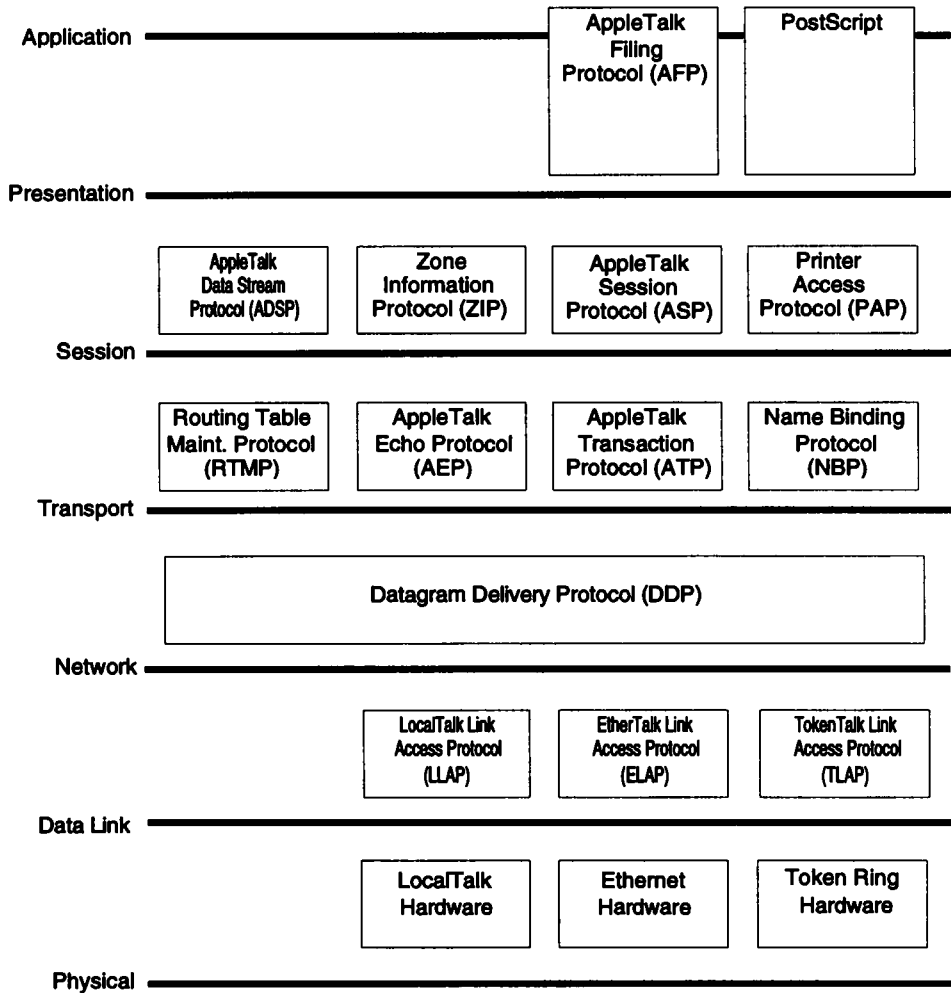
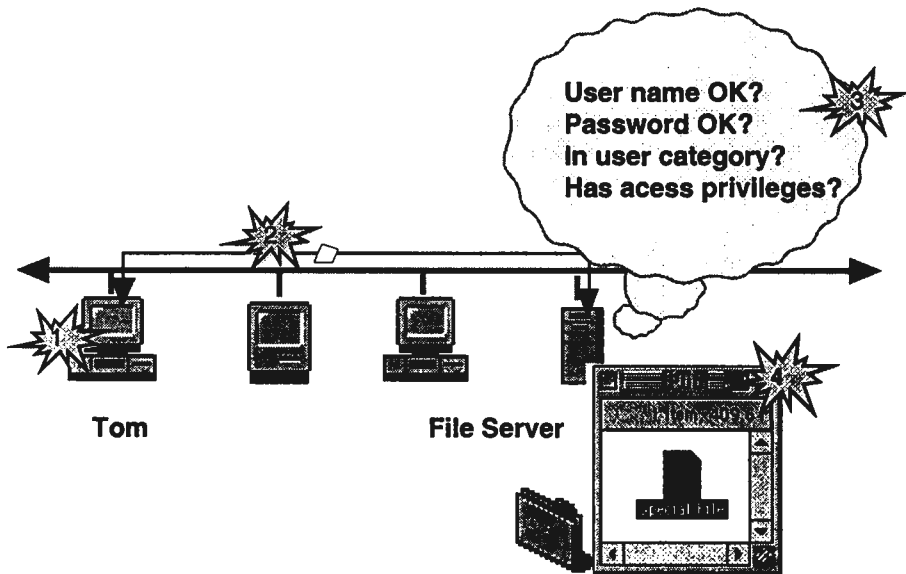


FIGURE 4-1: AppleTalk in the OSI reference model.

Let's look at how these protocols come into play during a typical AppleShare client-server transaction.

## AppleShare in Action

Once AppleShare has prepared some of the server machine's folders to be shared on the network, AFP makes possible the transfer of files to and from these share points. It does it like this:



---

FIGURE 4-2: Client-server communication using AFP.

1. Tom wants to read the data in a file that resides on the hard disk of an AppleShare file server. If the file were resident on the hard disk of Tom's own computer, his request to open it would be handled by Mac OS file system commands. Because it is not, AFP is called in to permit Tom's computer to use these same file system commands on the remote hard disk.
2. When it realizes that the file Tom wants to read is on a remote hard disk, the Mac OS routes its file system commands to the AFP translator, which turns the file system commands into AFP calls. These calls are then transferred across the AppleTalk network from Tom's com-

puter to the AppleShare file server. The interaction is handled through the AppleTalk Filing Interface (AFI).

- Before any AFP calls can be transferred, Tom must log in. His computer must first find the server on the network. It can do this because, at startup, the AppleShare File Server called on the AppleTalk Session Protocol (ASP) to open a Session Listening Socket (SLS) and Name Binding Protocol (NBP) to register its name and type with this socket. Specifically, it is registered on the network as "AFPServer." When Tom selects the AppleShare icon in his Chooser (in the upper left), his Macintosh initiates an NBP lookup that returns the names of all machines advertising this socket within the same zone (in the upper right).

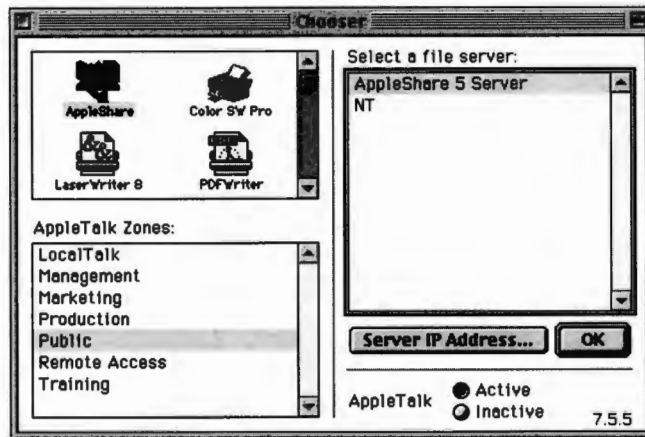


FIGURE 4-3: Looking for the AFP server.

- Once it has located the server, Tom's computer chooses which AFP version and User Authentication Method (UAM) it will use for the communication session. Using this UAM, the server then asks Tom for a user name and password that it knows. The UAM will usually be **Clear text**, meaning that anyone with a network packet analyzer theoretically can eavesdrop and read it, or **Two-way Scrambled**, which is illegible to an eavesdropper and therefore more secure.

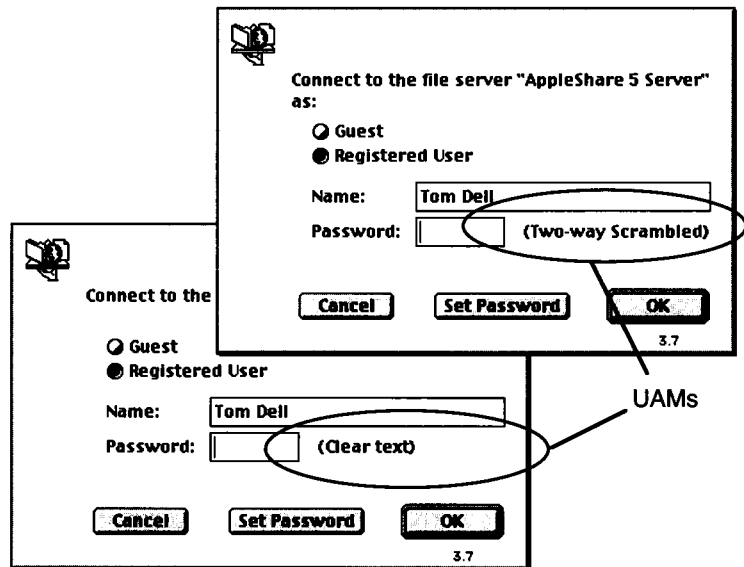
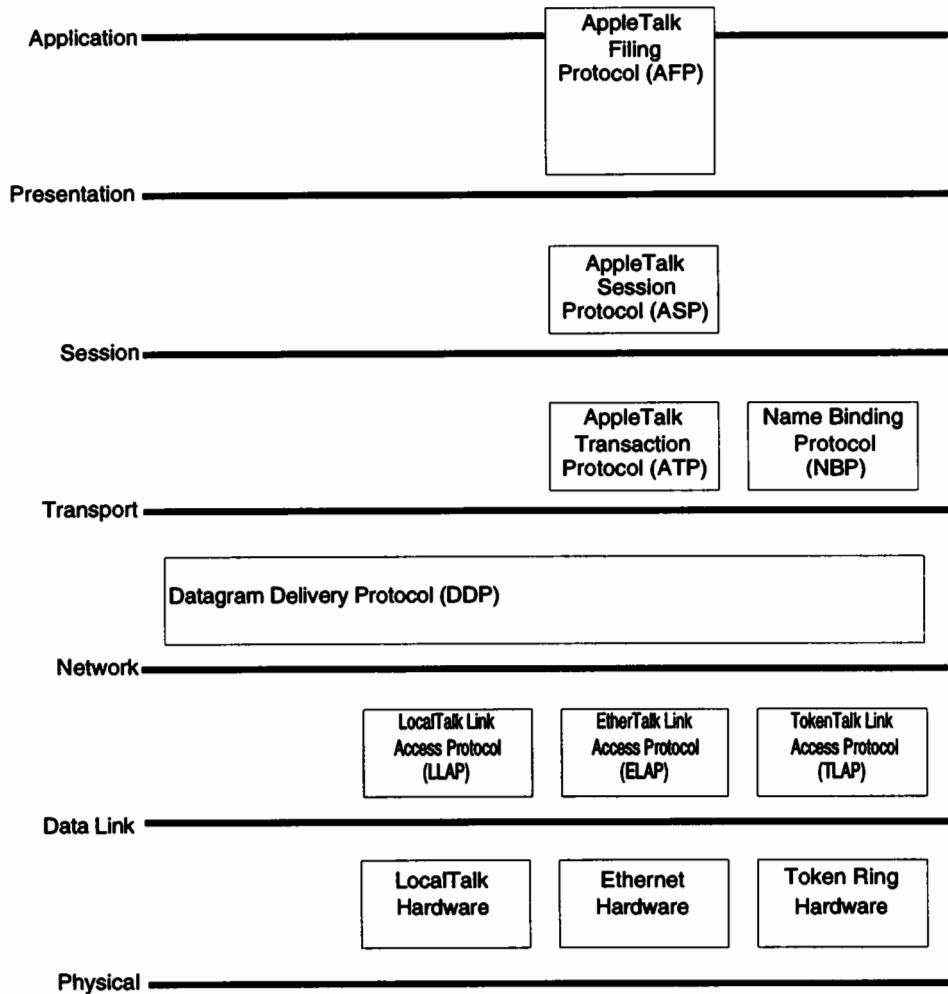


FIGURE 4-4: Choosing user authentication methods.

5. If Tom supplies his user name and password correctly, the server then considers whether or not his name falls into one of shared volumes' user categories. If it does, the server lets Tom's computer mount the shared volume on its desktop to be used as if it were a local drive.
6. The server also examines Tom's user category to determine what access privileges he will be granted to items in the mounted volume. If Tom has been granted the access privileges necessary to read the file, the file's data can be transferred across the network to his computer.

Going back to the OSI model, the AppleTalk protocols that were employed here are shown in Figure 4-5:



---

FIGURE 4-5: Client-server session in the OSI model.





---

*Note: If you want to know more about how AppleTalk works, the definitive source is Inside AppleTalk, 2nd Ed., by Gursharan S. Sidhu, Richard F. Andrews, and Alan B. Oppenheimer (Apple Computer/Addison-Wesley). Note that Alan's company, Open Door Networks, makes the useful AppleShare IP utilities HomeDoor, LogDoor, and AFP Engage!, which are discussed further on.*

---

With the introduction of AppleShare IP 5.0, Apple took a product that made the most sense for small, Mac-OS-only networks and upgraded it to a viable solution for medium-sized, mixed-platform networks and intranets. This became possible with Apple's adoption of platform-independent TCP/IP.

## TCP/IP and the OSI Model

I've heard many a lecture on "what is wrong with AppleTalk" over the years. It's chatty, it doesn't scale, it's hard to manage. These criticisms have never shaken my faith in this elegant protocol. Of course, I usually hear them from people who do not know the difference between AppleTalk (a protocol) and LocalTalk (a cabling scheme), which has not helped. I think that AppleTalk's greatest limitation is simply that it is proprietary to Apple Computer. Although it can be run on PCs and UNIX machines as well as on a Mac OS computer, it has never become the universal standard that the Internet's TCP/IP is.

TCP/IP is an open standard whose protocols are free to everyone. It can also be compared to the OSI model, and therefore AppleTalk, although it does not truly implement the Presentation and Session layers.

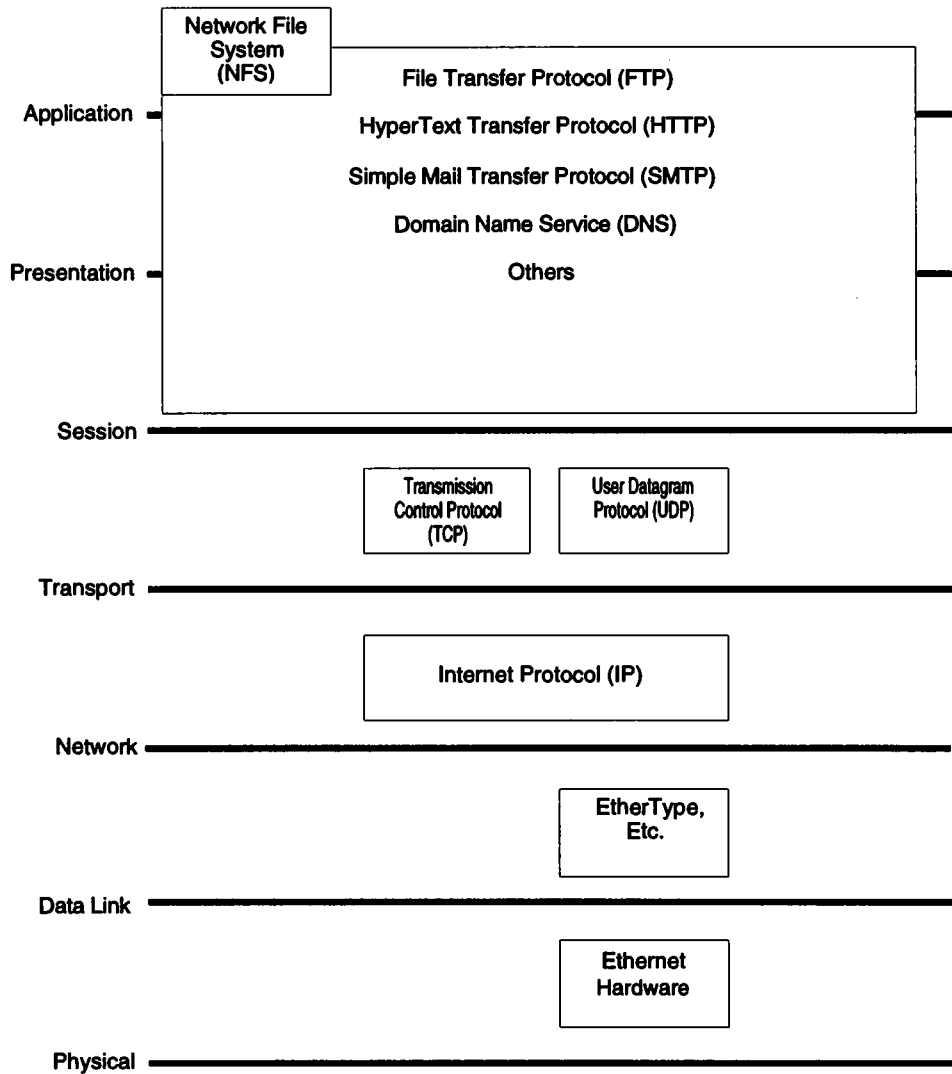


FIGURE 4-6: Simple TCP/IP in the OSI reference model.

There are a multitude of protocols within the TCP/IP suite (only a few of which are shown in Figure 4-6). The one that concerns us here is FTP.

## FTP in Action

While the Macintosh has been capable of running TCP/IP in addition to AppleTalk for years (MacTCP), it was not until the introduction of AppleShare IP 5.0 that AppleShare users were given the option of using FTP *instead* of AFP for client-server communications. More important, FTP now makes an AppleShare server available to most types of computers throughout the world, since most computers are capable of communicating over TCP/IP.

FTP differs somewhat from the traditional model of file sharing as we know it in AppleShare. Under AppleShare, shared volumes are available to client users as though they were additional storage media attached to the users' local computers. The clients can therefore "open" a file from these volumes over the network. FTP requires that such a file be copied to the local client computer before it can be opened. In short, it permits just what the name specifies, *file transfer*, and not really *file sharing*.

Both AFP and FTP require that a reliable connection between the client and server be created over which files can be transferred. However, the mechanism for creating this connection differs between the protocols. In AppleTalk, AFP relies on the ASP, which in turn requires ATP (see Figure 4-1). In TCP/IP, FTP relies on TCP.

TCP creates a *virtual circuit* by supplying the server with the client's IP address and a unique socket number and then requesting a connection. The server responds with a socket number of its own, and the TCP connection is opened.

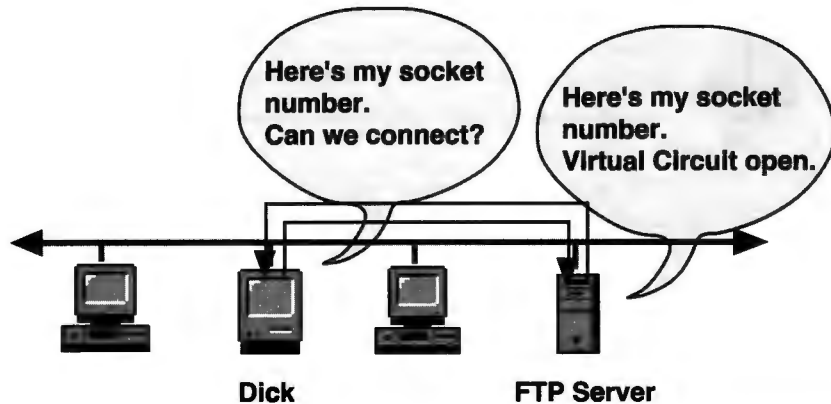


FIGURE 4-7: Creating a TCP connection.

Once the TCP connection is created, an FTP transaction works in much the same way that an AFP transaction does, with some important differences. FTP makes use of two TCP channels that are identified by their port numbers. Port 20, the Data Transfer Process (DTP), is the data channel; Port 21, the Protocol Interpreter (PI), is the command channel. The use of two channels enables FTP to transfer data and command information separately and simultaneously.

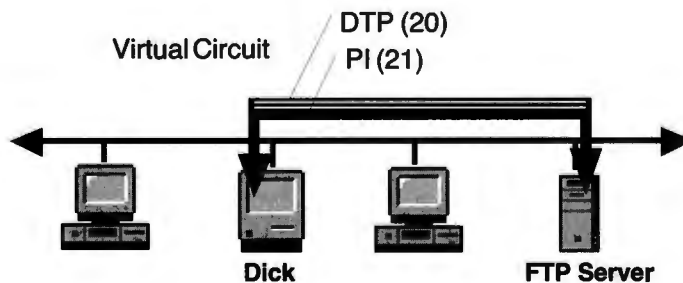


FIGURE 4-8: FTP channels within TCP Virtual Circuit.



---

*Note: A great source for more information about this is TCP/IP Clearly Explained, 2nd Ed., by Peter Loshin (AP PROFESSIONAL, 1997).*

---

FTP does file transfers very well, and it does them from just about any kind of computer. You can sit yourself down in front of a UNIX computer and type in the command lines needed to copy down a file from my company's server like this:

```
ftp> ls
200 PORT command successful.
150 Opening ASCII mode data connection for /bin/ls.
total 2
-r-xr-xr-x  1 owner   group 266240 May 16 16:39 AssetDB.fmp
-r-xr-xr-x  1 owner   group 366311 May 16 16:39 AssetDB.hqx
226 Transfer complete.
ftp>
ftp> get assetdb.hqx
200 PORT command successful.
150 Opening ASCII mode data connection for ASSET-
DB.HQX.HQX(19196 bytes).
226 Transfer complete.
Download completed at 6/20/97 8:09:10 PM
ftp>
```

---

FIGURE 4-9: Transferring a file with a command line session.

You can just as easily sit down in front of a Macintosh and download that same file using Fetch, Jim Matthews' well-known Mac OS shareware utility (Dartmouth College).

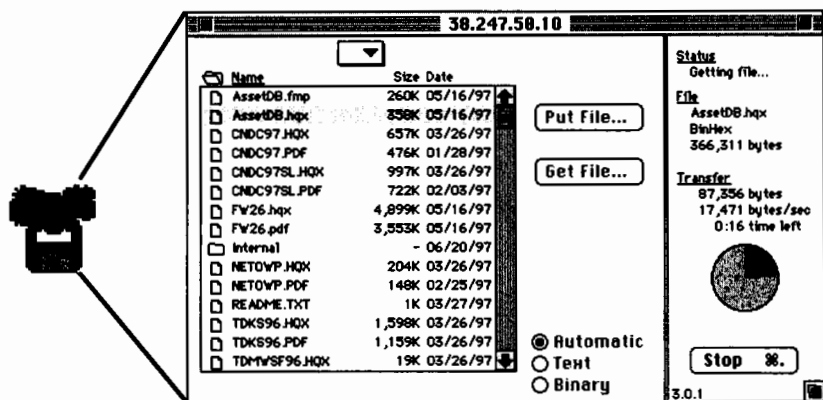


FIGURE 4-10: Transferring a file with Fetch.

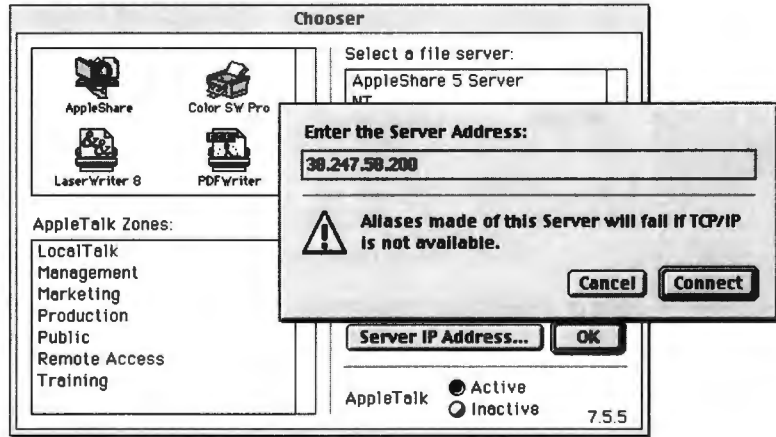
The same commands are used in both cases. Fetch just hides the command line behind the Mac OS' Graphical User Interface (GUI). The most significant FTP commands are **Put**, which lets you copy a file to the server, and **Get**, which lets you copy a file from the server.

## Something New: AFP over TCP!

As elegant as the original AFP is, it is not particularly well suited to large heterogeneous networks. Recognizing this, and looking to gain file transfer speed, Apple engineers set about to create an AFP that could work over AppleTalk and TCP concurrently. The result was AFP version 2.2, which was first implemented in AppleShare IP 5.0 and its AppleShare Client version 3.7.

The new protocol implementation's design properties include a special layer that establishes a liaison between AFP and TCP. This is the Data Stream Interface (DSI), so named because it works over any data stream protocol in addition to TCP. As ASP does in AppleTalk, DSI registers the AFP server on a network socket. Under TCP, it uses Port 548.

While AFP/TCP's new capabilities are impressive, they remain invisible to Mac OS users. Accessing a server's shared volumes is still as simple as going to the Chooser and mounting a shared volume on the desktop, except that now that server might be half a world away!



---

FIGURE 4-11: Performing a login with AFP/TCP.



---

*Note: If you would like to learn the programming details of the new AFP, you may download the AppleTalk Filing Protocol 2.2 & AFP over TCP/IP Specification from Apple's Web site.*

---

## APPLESHARE CONCEPTS

Whether you use AppleShare IP 5.x, any of its predecessors, or Personal File Sharing, it is important to know the terms used in the file sharing model.

## Share Points

A Mac OS computer running either AppleShare or Personal File Sharing software can make its files available to be read over the network in what have traditionally been referred to as *shared volumes*. These are storage devices (such as hard disks or CD-ROMs) physically attached to the server.

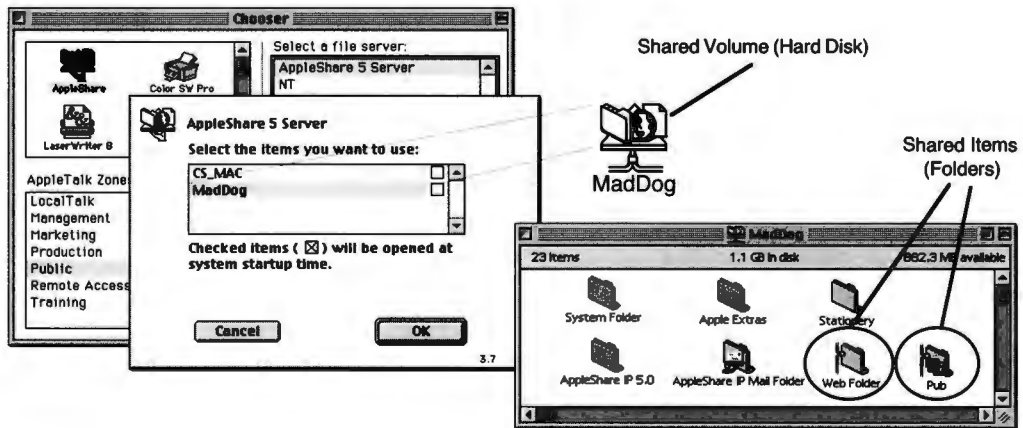


FIGURE 4-12: Assorted share points.

*Shared items* generally refer to the individual folders on a given storage device that are accessible over the network. Functionally, these are the containers that users select in the Chooser and mount on their desktops. Collectively, shared volumes and shared folders are referred to as *share points*.

*AppleShare does not share individual files directly.* This is an important difference from some other file servers. AppleShare shares only the folders and disks that contain files.



## Access Privileges

Like most file servers, AppleShare controls who will be given access to which shared volumes, and any folders and files within them, through *access privileges*. (Many other file servers use the term *access rights*. If you move to AppleShare IP from one of those other server products you will have to tell your users, “It’s no longer a right, it’s a privilege!”)

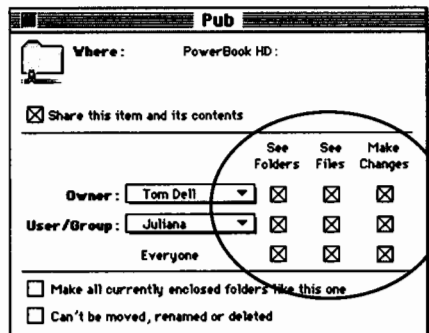
### AppleShare 3.x/4.x

Under AppleShare 4.x and earlier, or pre-Mac OS 8 Personal File Sharing, access privileges are grouped in three categories.

**See Folders.** You may open a folder to see any other folders it contains.

**See Files.** You may open a folder, see the folders and files inside, and read those files.

**Make Changes.** You may open a folder, see the folders and files inside, and read, move, modify, delete, or write files.



---

FIGURE 4–13: Earlier Mac OS file sharing access privileges.

Each access privilege can be applied to any folder singly or in combination, creating the possibility of seven access levels.

Again, AppleShare does not share individual files, so all access privileges apply only to a given file's enclosing folder.

## AppleShare IP

These traditional access privileges have slightly different counterparts under AppleShare IP and Mac OS 8 Personal File Sharing. They are now grouped in the following categories.



**Read & Write.** You may open a shared volume to see what folders and files it contains; you may copy folders and files to and from it; and you may open, create, move, modify, and delete those folders and files. These are full access privileges.



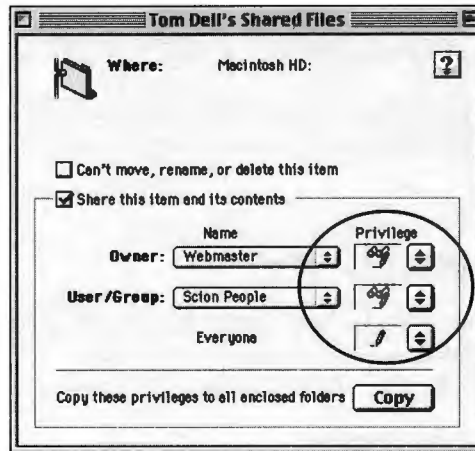
**Read Only.** You may open a shared volume to see what folders and files it contains, and you may copy folders and files from it and open them.



**Write Only.** You may copy folders and files to the shared volume. A shared volume with such access privileges is commonly called a “drop box” because you can copy data into it but cannot open it to see what else is inside.



**None.** You may not open the shared volume to see what is inside, or copy folders and files to or from it. You may not even log into it. The shared volume appears in the Chooser, but is grayed out.



---

FIGURE 4-14: Current Mac OS file sharing access privileges.

## Accounts

Access privileges are assigned to two types of server *accounts*:



**Users.** *User* accounts each contain a user name and password. Most often, they are called by people's real names (e.g., Jane Doe). Some organizations, such as schools, prefer to call them by machine names (e.g., Station 1). This permits many people to use a single account.



**Groups.** For convenience, collections of users can be given access to the same share points through *group* accounts. Different groups are then given access to only the shared items that concern them. Most often, these items are named for departments (administrators, accountants, etc.).

Users may be members of many different groups and therefore may have many different levels of access. A user account and password are required to be part of a group.



*Note: Have you noticed that users look happier in Mac OS 8 than in System 7? See for yourself:*



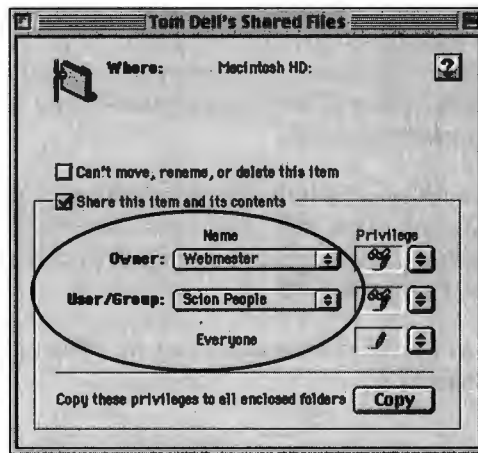
---

FIGURE 4-15: System 7 users versus Mac OS 8 users.

---

## User Categories

To access a shared volume, a user or group must fall into one of three categories associated with it.



---

FIGURE 4-16: User categories for a shared volume.

---

## Owner

This is the person who created the item being shared. When a folder is created on the server directly, ownership is assigned to the administrator account. When someone creates a folder on the server from a remote workstation, that user's account is usually assigned here. More on this later.

## User/Group

Here a second account may be granted access to the shared item in addition to the owner. This can be one other individual if a user is selected, or several people if a group is used.

## Everyone

If a user is not specifically listed in the Owner or User/Group field, either directly or by group association, that account will not be allowed access to this shared item unless access privileges have been assigned to this category. Conversely, assigning access to the "Everyone" category, formerly called "Any User," makes the shared item available to any registered AppleShare User.

As ominous as it might sound, this fact in and of itself does not jeopardize the overall security of your server. What it does do is enable login access to the "guest" account, which in turn derives its access permissions from the Everyone field.

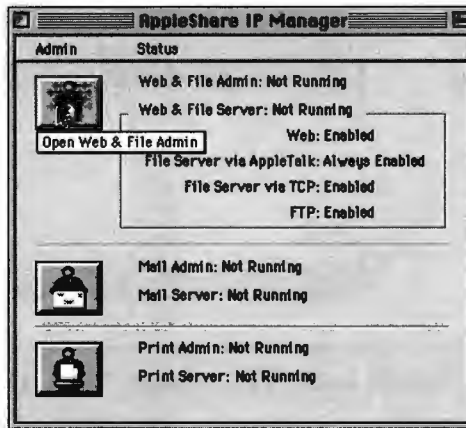
I will discuss the nuances of file sharing privileges and user accounts in Chapter 8.

## ESTABLISHING FILE SERVICES

Enough with the background! Time now to try out your newly installed server. In this section I will show you how to get it up and running fast. We will spend more time on the management concepts further on.

### Launch Web & File Server Admin

To use the file server for the first time, launch the Web & File Server Admin application. Double-click on it directly or, if you have AppleShare IP Manager running, press the first button in the window. (You can also choose the **Open Web & File Admin** command under AppleShare IP Manager's **File** menu bar item.)

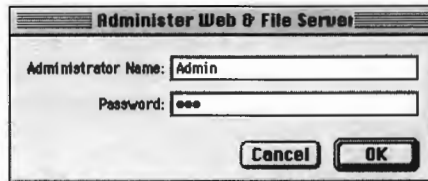


---

FIGURE 4-17: Launching Web & File Server Admin from AppleShare IP Manager.

This will open a password dialog box, in which you must enter the **Administrator Name** and **Password**, which are the same as the **Owner name** and **Owner Password** you entered during the server's setup (see

Chapter 3). This precaution prevents unauthorized people from sitting down at your server and reconfiguring AppleShare for you, although it will not stop them from trashing files on the hard disk.



Press the **OK** button when you have done this, and the Web & File Server Activity window will appear.

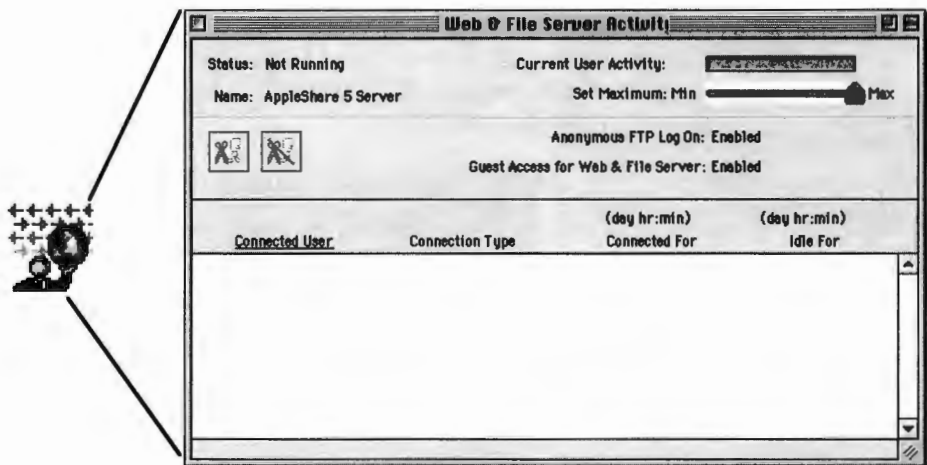


FIGURE 4-18: AppleShare IP Web & File Server Admin and its Web & File Server Activity window.

This window is designed to tell you, at a glance, the users connected to your server and how active they are. You can toggle between making the window visible and invisible with the **Show Web & File Server Activity** command under the **Server** menu bar item, or with the **Command (⌘)-K** key combination.

If you had Web & File Server launched automatically at startup when the choice came up in Easy Setup, you will now notice that the Status line in the upper left corner lists it as “running.” Otherwise . . .

## Launch Web & File Server

If the Web & File Server application is not already running, you can launch it manually by choosing the **Start Web & File Server** command under Web & File Admin’s **Server** menu bar item (or by pressing the **Command (⌘)-I** key combination).

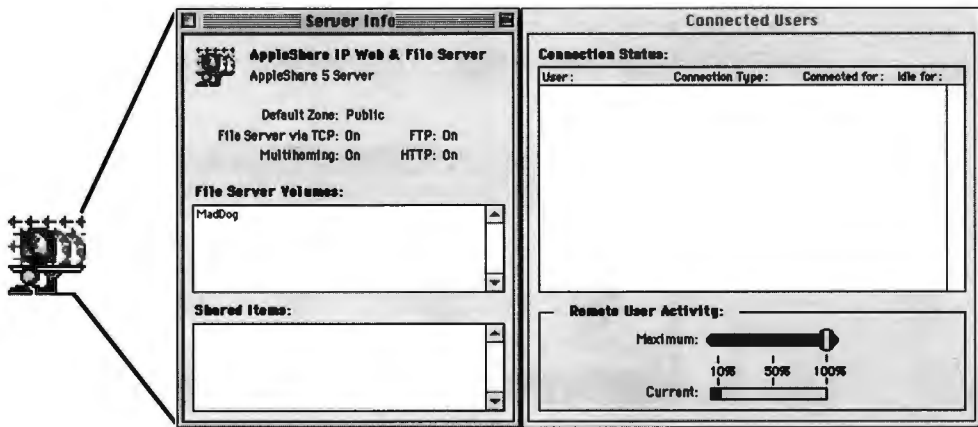


FIGURE 4-19: AppleShare IP Web & File Server and its Server Info and Connected Users windows.

Do the Server Info and Connected Users windows look familiar? They should, since they maintain AppleShare’s traditional interface. These windows differ little from their counterparts in AppleShare 3.x and 4.x. Note that much of information displayed in the Web & File Server Activity window is duplicated here.

If you have upgraded your server from an earlier version of AppleShare or from Personal File Sharing (see Chapter 3), you will see your original



share points listed in the Shared Items pane in the Server Info window (lower left). If not . . .

## Create Share Points

Let's give the server something to share. Create a folder on the server's hard disk and name it "Pub." We will make this the container for any files that you wish to share with the rest of the world via *Anonymous FTP*. "Pub" is a commonly used Internet convention that designates a "Public" directory.

You will also need to share the "Web Folder" that AppleShare IP created on the server's hard drive automatically when the Web & File Server was first started. Doing so will give Web browsers access to the Web server's HTML pages.



---

FIGURE 4-20: Creating a folder for Anonymous FTP.

To continue, bring Web & File Admin forward in the Finder and select the **Show Disks & Share Points** command under the **Server** menu bar item (or use the **Command (⌘)-L** key combination). Here, click on the arrow next to the name of the server's hard drive to get a cascading view of its contents and then choose "Web Folder" in the list.

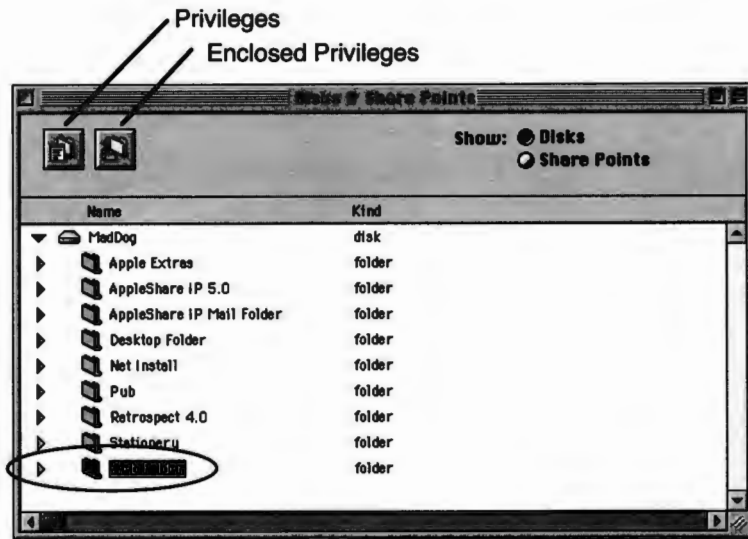


FIGURE 4-21: Configuring the share point.

When a folder—a potential *share point*—is highlighted in this list, the **Privileges** and **Enclosed Privileges** buttons become active. The **Privileges** button determines what access privileges the selected folder will have. The **Enclosed Privileges** button determines what access privileges all folders within the selected folder will have. If you press it, all subfolders will adopt the privileges of the parent folder.

Choose the **Privileges** button here to open the Web Folder's Privileges dialog box (or just double-click on it).



FIGURE 4-22: Share point privileges.

In the Privileges window, choose the **Make this a share point and set privileges** button in the Select Privileges field. The Administrator's account name is listed in the **Owner** field by default. All you need to do at this point is change the access privileges for **Everyone** to **Read Only** (eyeglasses) in the field's pop-up menu. Press the **Save** button; then close the Privileges window when you have finished.

Repeat this process for the Pub folder. Once you have done this, you will notice that the icons of the two folders in the Disks & Share Points window have changed to show that the folders are now accessible over the network.

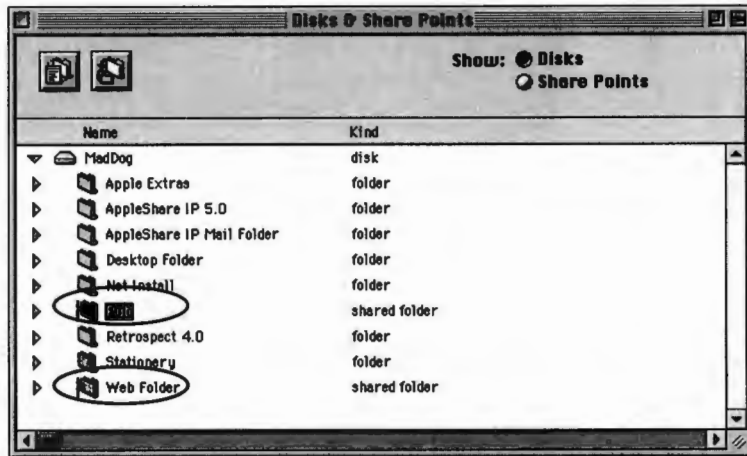
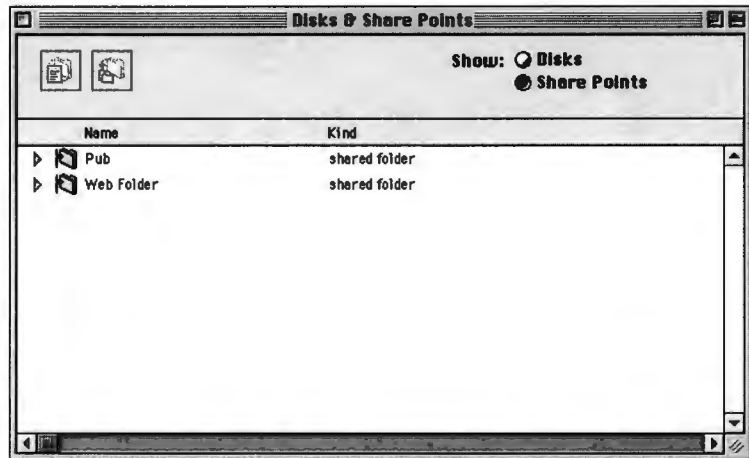


FIGURE 4-23: Folders enabled as share points.

Why give everyone just read-only privileges? Security. If you are on the Internet, these folders will be open to anybody, and some malicious souls have been known to upload viruses and other nasty things to unsuspecting sites that permit write access. In other cases vandals may upload so much data to the server that it fills up the hard drive and causes a system crash. This is known as a Denial of Service attack. Unless you have a good reason for letting strangers upload to your server, stick with read-only privileges. (If you need to enable write privileges, get Santorini's Server Tools, discussed later in this chapter.)

Rather than search through all of the hard disk's folders to see your shared items, you may now press the **Share Points** button to display only these two shared items.



---

FIGURE 4–24: Viewing share points only.

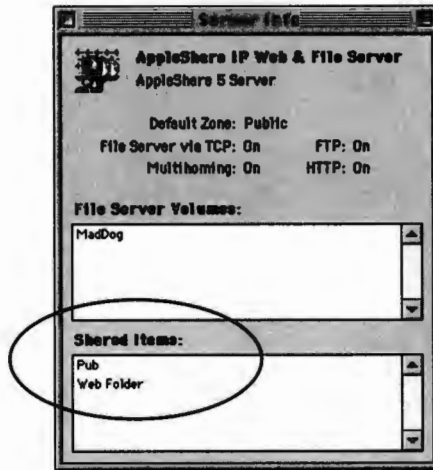


---

*Note: If you were to share the server's startup volume ("MadDog" in the illustrations), all folders on that volume would become shared items except the System Folder.*

---

You may close the Disks & Share Points window. The two new shared volumes should now be visible in the Server Info window of the Web & File Server application.

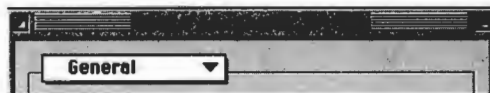


---

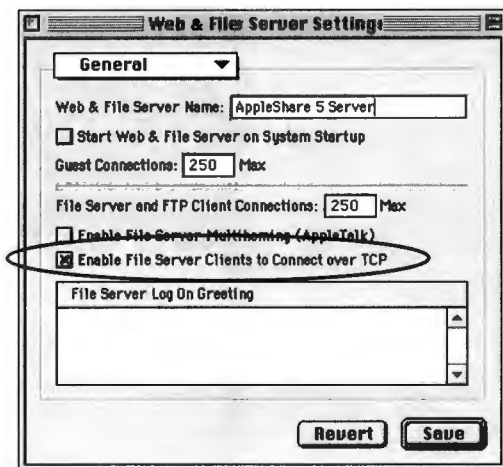
FIGURE 4-25: New shared items in the Server Info window.

## Enable AFP/TCP

Next, choose the **Web & File Server Settings** command under Web & File Server Admin's **Server** menu bar item. This will open the Web & File Server Settings dialog box in the **General** category (upper left):



At this point, your server is network accessible via the Chooser using AppleTalk, a Web browser using HTTP, and an FTP client through TCP/IP. If you want to make it accessible to Macintosh users via the Chooser and AFP/TCP, select the **Enable File Server Clients to Connect over TCP** checkbox.



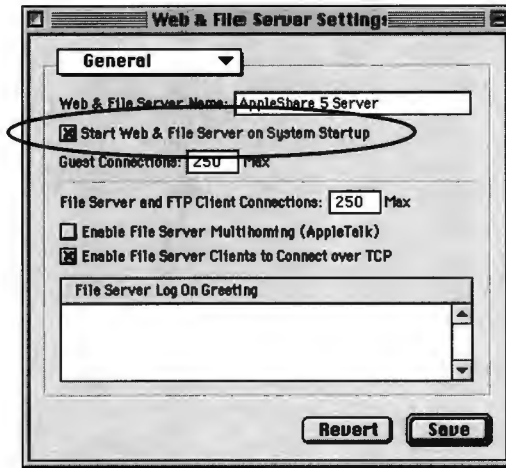
---

FIGURE 4-26: Enabling AFP/TCP access.

Now any Mac OS computer with the AppleShare Client version 3.7 or above may take advantage of this new AppleShare IP feature.

## Automate Startup

If you did not tell Easy Setup to start your file services automatically, you have another chance to make this happen here. Just select the **Start Web & File Server on System Startup** checkbox.



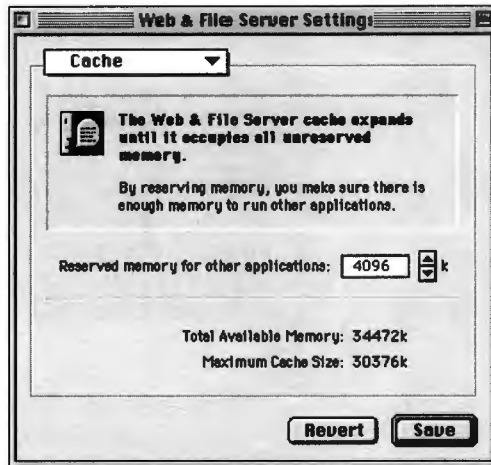
---

FIGURE 4-27: Enabling automatic startup.

## Reserve Memory

Next, choose **Cache** in the Web & File Server Settings window's pop-up menu. This very important setting determines the amount of RAM AppleShare IP uses to pre-load commonly accessed information, which reduces the number of calls made out to the hard drive when users request that data, and thus makes the server faster.





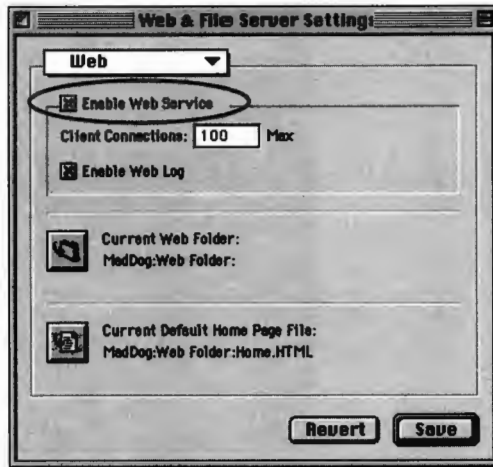
---

FIGURE 4-28: Setting aside some RAM.

By default, AppleShare IP gradually grabs all available RAM, leaving just 1 Mbyte for other applications. This makes the server far faster than it would be without caching, but it leaves little RAM for other applications that might reside on your server, such as Retrospect or Server Manager. You will therefore need to add up each application's memory requirements and make sure that enough RAM is left for them by setting the **Reserved memory for other applications** field.

## Enable Web Services

Next, choose **Web** in the Web & File Server Settings window pop-up menu.



---

FIGURE 4-29: Enabling Web access.

If you want users to be able to see the HTML pages stored in the Web Folder, you must make sure the **Enable Web Services** checkbox is selected here.

## Enable FTP

Next, choose **FTP** in the Web & File Server Settings window pop-up menu.

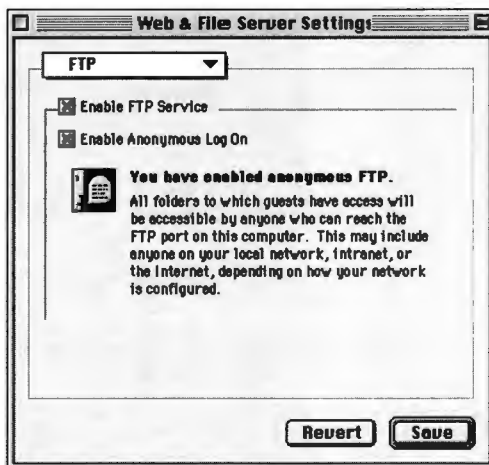


FIGURE 4–30: Enabling FTP access.

The purpose of the Pub folder is to provide a safe place in which anyone in the world may log in to download files from your organization. To really make this possible, select the **Enable FTP Services** and **Enable Anonymous Log Ons** buttons here. Press the **Save** button when you have done this.

The "Enable Anonymous Log On" feature is not exactly the same as guest access, as I will show you further on. To use an anonymous logon, an unknown user must log in over FTP with the account name "anonymous." It is customary for such a user to use an email address as the password.

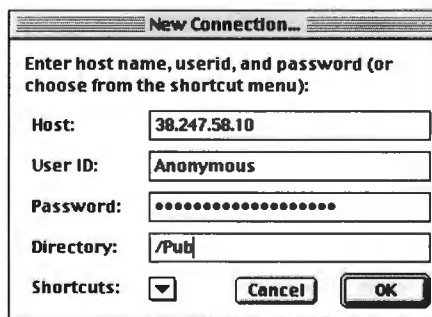


FIGURE 4–31: Logging in with Anonymous (via Fetch).

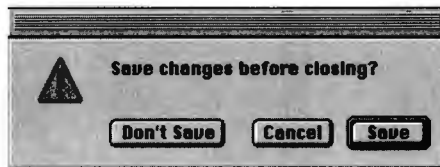
This feature is similar to guest access, however, in that any shared item on your server that is open to guests is also open to anonymous FTP users. Both derive their access levels from your configuration choices in the everyone category.

Note that whenever you make a change to the settings in these dialog boxes, the **Revert** and **Save** buttons become active.



To apply your changes, press the **Save** button. To go back to the settings that were there previously, press the **Revert** button.

You do not have to press the **Save** button each time you choose a new category in the pop-up menu. Simply close the Web & File Server Settings window when you have finished, and you will be prompted to save all your changes.



That's all for now. Your server is up and running. Next you will need to establish accounts for everyone who will be using it.



---

*Note: Before subjecting your new file server to a full workload it is wise to test it. Enable its basic functions and then let a select group of competent users copy files back and forth from it for a week or so. In this way you should be able to identify and correct problems before the server becomes a vital component of your organization's day-to-day operations.*

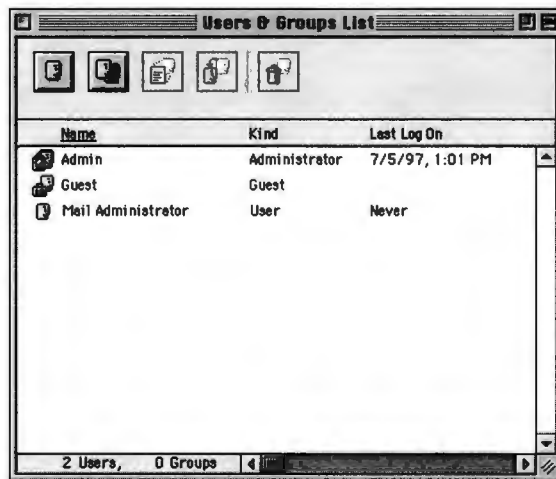
---

## MANAGING USERS AND GROUPS

By this point, you have made a couple of share points available to anyone by assigning read-only access to the everyone category. Naturally, these shared items should contain nothing that you do not want everyone to see. To share files that are restricted to certain people, you will need to create user accounts and passwords for those people. Under AppleShare IP, people who have such accounts are called *registered users*.

### Creating Users

To create a user account, begin by selecting the **Show Users & Groups List** command from Web & File Admin's **Users** menu bar item. This will open the Users & Groups List window.

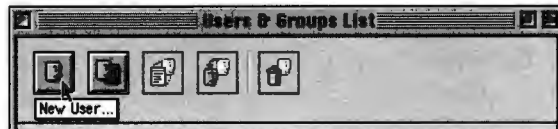


---

FIGURE 4-32: Opening the Users & Groups List.

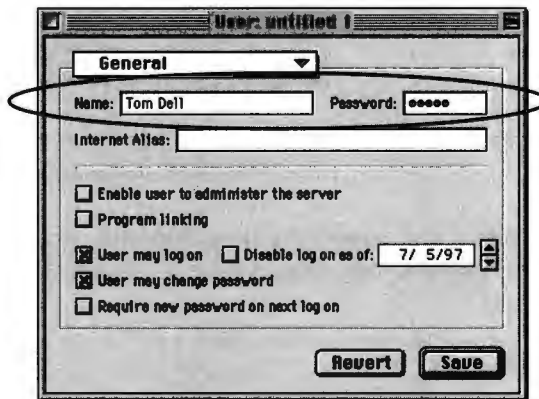
If you have upgraded from Personal File Sharing or a previous version of AppleShare, your original users and groups will be visible here.

Press the **New User** button in the upper left of the Users & Groups List window (or press the **Command (⌘)-N** key combination).



This opens an untitled User dialog box with the **General** category selected in the pop-up menu. Type a name or machine designation in the **Name** field and a password in the **Password** field. User names may be up to 31 characters long and are not case-sensitive. Passwords may be up to eight characters long and *are* case-sensitive (resulting in novice user mistake #1).

You do not have to assign a password, but I strongly recommend doing so if your server's volumes contain anything of value.



---

FIGURE 4-33: Entering a user name and password.

Next, enter a name in the **Internet Alias** field. The Mail Server uses the Internet alias as a user email address. A valid Internet alias must be

unique and consist of alphanumeric characters. It is not case-sensitive, and some “special” characters are permitted:

! # \$ % & ' \* + - / = ? ` { } | ^ \_ ~ .

People may also use their Internet aliases instead of their user names to log on to the file server. You cannot type in an Internet alias that is the same as the name you typed in the **Name** field. If you want the two to be the same, leave the **Internet Alias** field empty; then make sure that there is a name in the **Name** field that is valid according to the criteria required of an Internet alias.

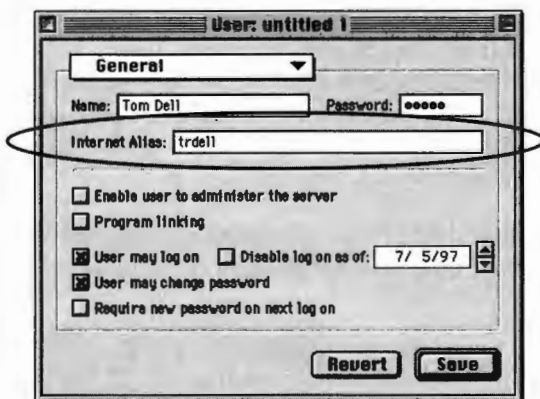
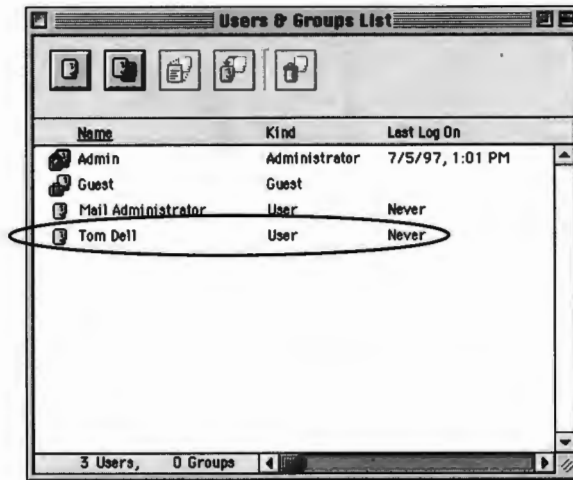


FIGURE 4-34: Entering an Internet alias.

When you have done this, close the window and save the changes when prompted. You should now see the new account in the Users & Groups List.



---

FIGURE 4-35: A new user in the Users & Groups List.

## Managing Users

Several options are available for controlling an individual's access to server resources. By default, all new users are assigned a couple of privileges automatically. These are visible in the User dialog box when **General** is chosen in the pop-up menu.



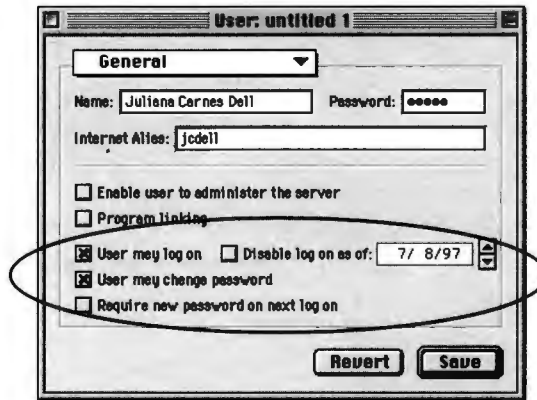



FIGURE 4-36: Default privileges for new users.

## Logon Enabled

Think of this as turning file server access “on” or “off” for a given user. Whenever you want to prevent someone from using an account to log on to the Web & File Server or Mail Server, simply de-select the **User may log on** checkbox.

 John Larocca	Disabled User
 Jon Larson	User

This feature is useful for security. When people leave your organization it is wise to remove their accounts immediately so that they do not inadvertently create a break-in point for some hacker. Sometimes, however, you will want to preserve these accounts for a while so that their associated access privileges may be re-assigned to the users’ replacements. De-selecting this checkbox renders the accounts inactive and harmless.

A related feature is the **Disable log on as of [date]** checkbox. When enabled it allows you to program an account to “time out” at a given time. This is particularly useful for temporary users. The account is not

deleted after the specified time has elapsed, but it is made inactive after the user attempts to log on beyond the date you have specified.



---

*Note: The Mail Server will continue to accept mail for this user beyond that date, but you will need to re-enable the **User may log on** checkbox if he or she is going to be allowed to read it.*

---

## Passwords

If the **User may change password** checkbox is selected, people may either create a password, if you did not assign one initially, or change one you assigned. If you want people to use only the passwords you assign, de-select this checkbox.

This setting only affects logons from the AppleShare client and client email applications such as Claris Em@iler. Users are not allowed to change their passwords via FTP.

If you click on the **Require new password on next log on** checkbox, you can assign simple passwords, such as people's first names, and then require that they be changed to something more difficult when users log on the first time.

This option works only with the AppleShare client, not with FTP, Mail Server, or Web connections, so do not enable it for the accounts of non-Mac OS users. They might not get the messages telling them that they need to create a new password and will get plenty ticked off when the server will not let them log on with the password you gave them!

In addition to these default settings, you have a couple of other choices here:

## Administrator Access

When you ran Easy Setup, it took the **Owner Name** and **Password** of the server computer and assigned them as belonging to the AppleShare IP administrator (see Chapter 3). With this user name and password, you have access to all of the AppleShare IP administrative applications running locally on the server machine. You also have access to the contents of all of the server's volumes remotely over the network, *whether or not they are designated as share points*. In the world of AppleShare, thou art God!

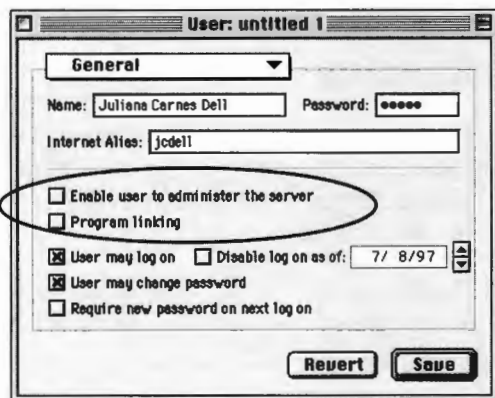


FIGURE 4-37: Additional privileges for new users.

You can bestow server divinity on others by selecting the **Enable user to administer the server** checkbox, thereby creating "super users." This feature permits you to share administration duties with other worthy souls, which is particularly handy when you go on vacation and need to give someone else administrative access to the server but not necessarily to your email.

This very powerful feature should be used carefully. If you enable it for the wrong people, you run the risk that they will see something they are not supposed to have access to or even delete something inadvertently. At the very least, it may confuse them when they see entire hard disks in their Choosers instead of the shared items they have grown accustomed to seeing.

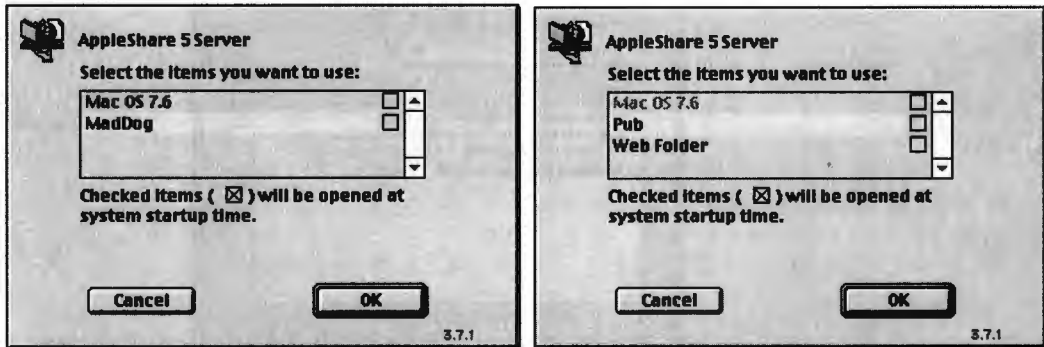


FIGURE 4-38: What a "super user" sees at login versus what a normal user sees at login.

## Program Linking

Program linking, a feature of the Mac OS since System 7, permits applications to share information and commands either locally or over the network. If an application that takes advantage of this feature is running on your server, you can allow applications on client machines to communicate with it by enabling the **Program linking** checkbox in a user account.

Exercise caution when enabling this function as well. Program linking is commonly used by remote administration applications that can pose a security risk in the wrong hands. For that reason, think of it as unnecessary unless you know exactly how and why it is being used.

## Comments

Are you finding some of this user-based information hard to keep track of? No problem. AppleShare IP's thoughtful engineers have provided a place for you to organize little details. Simply choose **Comments** in the pop-up menu and leave yourself, or other administrators, some notes.

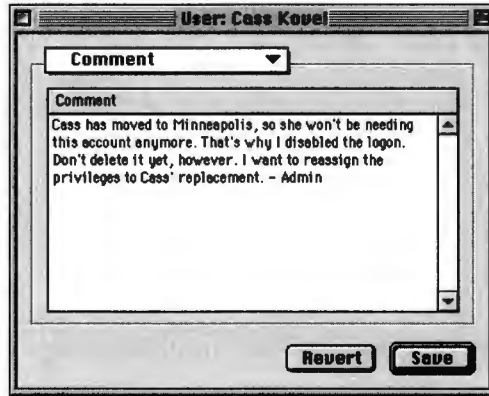


FIGURE 4-39: Leaving yourself a note.

You can type up to 255 characters here.

By the way, once you have created a user, you do not have to open its dialog box each time you want to change its attributes. Just choose a command under Web & File Server Admin's **Users** menu bar item.

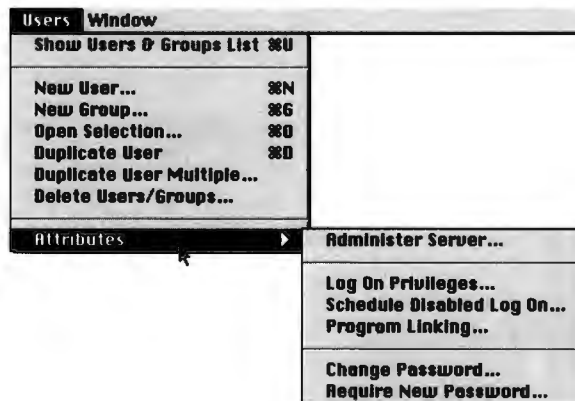


FIGURE 4-40: Changing attributes from the Users menu bar item.

## Special Accounts

In addition to the accounts that you create as server administrator, AppleShare IP creates three accounts of its own.

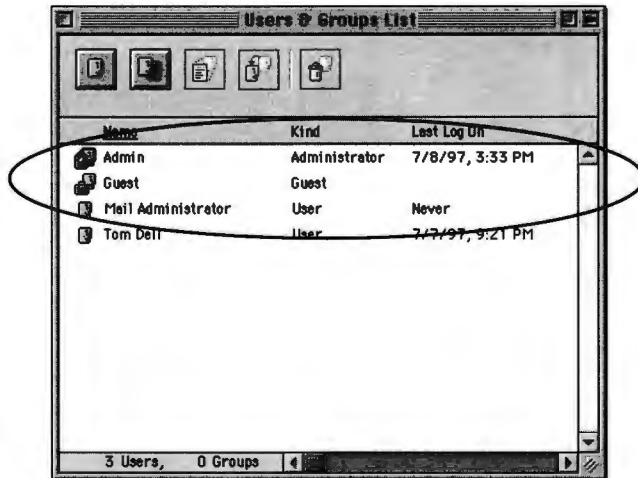


FIGURE 4-41: Special accounts created by AppleShare IP.



**Administrator.** This is a special account designed for use by your organization's server administrator—presumably you. It takes its name and password settings from the information you entered during the server's setup. I used the generic name "Admin" in my setup (see Chapter 3), but you might have used your own name. With this information, you can mount the server's entire hard drive on the desktop of a remote computer, see everything in it, and make changes to anything on it.

Although I am the administrator of my company's AppleShare IP servers, I have chosen not to use my name in the administrator account. By giving this account the generic name "Admin," I have separated my network identity from one of my job functions, so I can hand over access to the servers to someone else without also handing over access to my email.

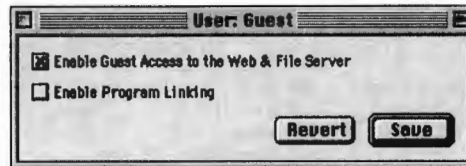
Any super users you create will be listed as "Administrator" under the Users & Groups List's Kind column.



**Mail Administrator.** This is a simple user account created to receive notifications from Internet-based email servers of email-related problems. Any email sent to the address of “Postmaster” should go here.



**Guest.** This account is for individuals who do not have their own accounts on your AppleShare IP server but with whom you still wish to share files.



---

FIGURE 4-42: Enabling guest access.

*This so-called “guest access” can be a very dangerous thing if not managed properly!*

Remember the everyone category? *Everyone* is not the same as *anyone* unless you enable logon privileges for this special account. Without guest access enabled, everyone means “any registered users.” With guest access enabled, everyone means “any registered users and anybody else!”

If you allow guest access:

- Anyone on your local network can log on to the Web & File Server using the AppleShare client and gain access to any shared item that permits everyone privileges.
- Anyone on your local network or on the Internet can use a Web browser to view the pages in the Web Folder, assuming that you have enabled the Web Folder’s privileges for everyone (as we did earlier in this chapter).



---

FIGURE 4-43: Logging on using guest access.

If you do not permit guest access, only registered users will be able to log on to the Web & File Server or read your Web pages. This makes for a more secure server. However, if you disable guest access . . .

- No one on your local network can log on to the Web & File Server using the AppleShare client and gain access to any shared item unless he or she has a registered user account, even if the shared item permits everyone privileges.
- No one on your local network or on the Internet can use a Web browser to view the pages in the Web Folder unless he or she has a registered user account.
- Anonymous FTP users on your local network or on the Internet *will* be able to access shared items that have everyone privileges enabled. *Whether or not you enable guest access, it will have no effect on whether or not Anonymous FTP access is allowed or denied.* This is an important distinction that many administrators who have been using AppleShare 3.x/4.x might not realize. Anonymous FTP access is allowed or denied in the Web & File Server Settings dialog box (which we set earlier in this chapter). For maximum security, it is no longer enough to simply disable the logon privileges of the guest account. You must disable Anonymous FTP access as well.

Confused? Worried? Don't be. Here are some simple rules:



- If you wish to maintain maximum security, disable both guest and anonymous FTP access.
- If you wish to permit outsiders to browse your Web site, permit guest access but allow only read privileges in the everyone category of the Web Folder.
- If you wish to allow outsiders to download software from your server via FTP, enable Anonymous FTP access but permit only read privileges in the everyone category of folders containing public data. I further recommend that you confine this access to a single Pub folder.
- If you wish to allow outsiders to download software from your server via AFP/TCP, permit guest access but give them only read privileges in the everyone category of folders containing public data, such as the Pub folder.
- If you enable either Guest or Anonymous FTP access, do not assign privileges in the everyone category for any folder that contains data or software that you do not want shared with strangers.

You can quickly tell if your server is open to guest and anonymous FTP users by looking at the Web & File Server Activity window.

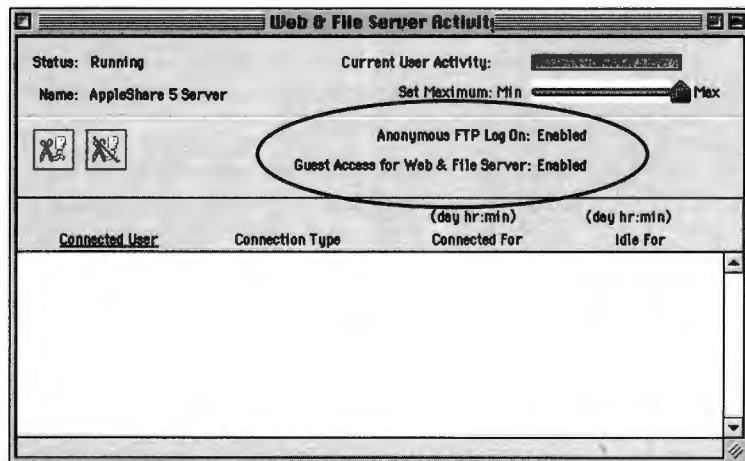


FIGURE 4-44: Guest and Anonymous FTP listed as enabled in the Web & File Server Activity window.

## Duplicating User Accounts

If the settings you have established for one user will be common for others, you can save some time by duplicating that account. To do this, select the user that you want to copy from the Users & Groups List, and choose the **Duplicate User** command from Web & File Server Admin's **Users** menu bar item (or press the **Command (⌘)-D** key combination).

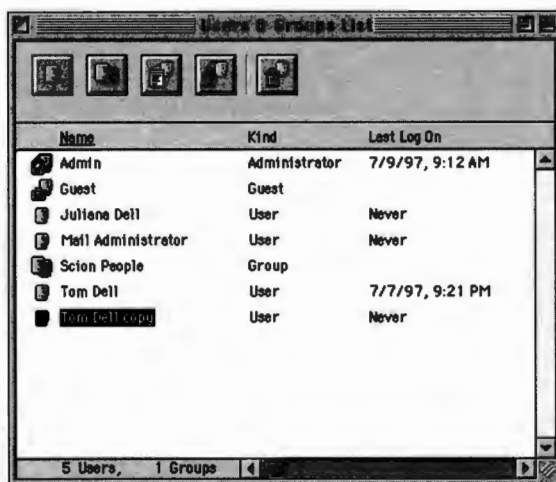
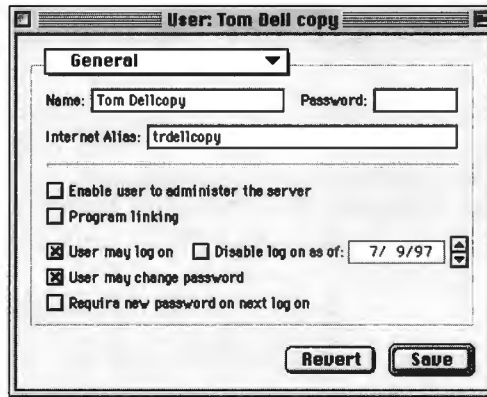


FIGURE 4-45: Duplicating a user.

The new user will have the word "copy" appended to its name, and will contain the same settings for general privileges, comment, and group memberships. You need only edit the **Name**, **Password**, and **Internet Alias** fields.



---

FIGURE 4-46: Editing a duplicated user account.

If you have many new user accounts to create, all of which will share the same privileges, you can save still more time by creating one user as a template and then creating multiple duplicate users.

To do this, select a user you want to duplicate in the Users & Groups List; then press the **Duplicate Users Multiple** button (or choose **Duplicate User Multiple** from Web & File Server Admin's Users menu bar item).



This will open the Duplicate User Multiple dialog box, where you add the names and passwords for the new users and press the **Add** button after each one.

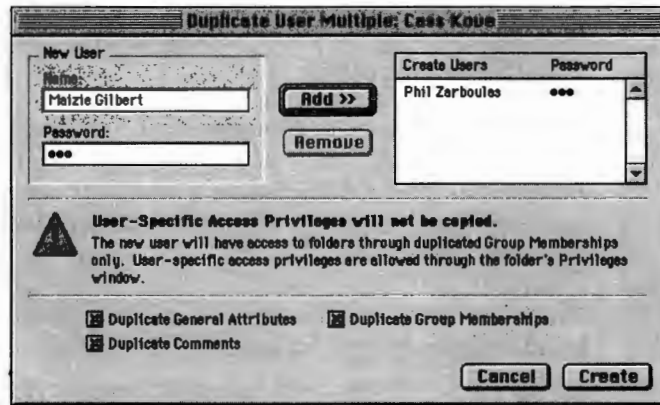


FIGURE 4-47: Adding multiple duplicated users.

When the **Duplicate General Attributes** checkbox is enabled, the new accounts will contain the same settings as those of the first user in the User dialog box's **General** category.

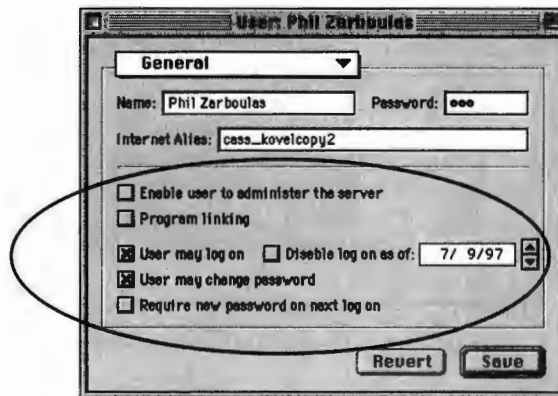


FIGURE 4-48: Duplicated general attributes.

If you de-select the **Duplicate General Attributes** checkbox, each new user will get only the usual default settings, **User may log on** and **User may change password**.

However, whatever information you may have typed in the **Comment** window in the first user's dialog box will not get copied over to the others unless you select the **Duplicate Comments** checkbox. So too with group memberships. Select the **Duplicate Group Memberships** checkbox to duplicate these.

Once you have done this, press the **Create** button. The new accounts will be added to the Users & Groups List window.

The duplication process does have a down side. Each duplicated account takes on an incremental adaptation of the first user's Internet alias. You will have to go back and edit all of these.

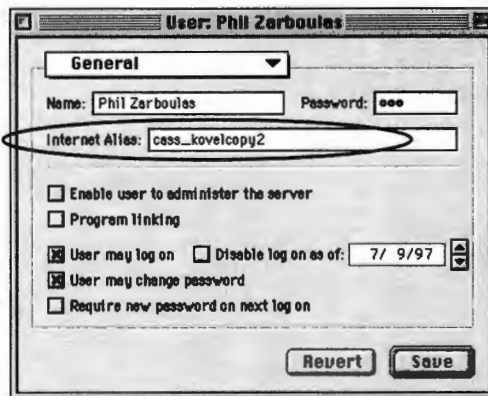


FIGURE 4-49: The duplicated Internet alias.

One of the pluses of the duplication process is that new users will not adopt the access privileges of the first user to any folders that the first user created. That means that you do not have to worry about letting a whole department into a private folder simply because you used that folder's owner as your template. The only access privileges new users will be granted come automatically from their group memberships.

## Creating Groups

To provide server volume access to a number of individuals, you must make them a part of the same group account. You may then assign this group to the user/group category of a shared item, associating it with whatever privileges you want its members to have.

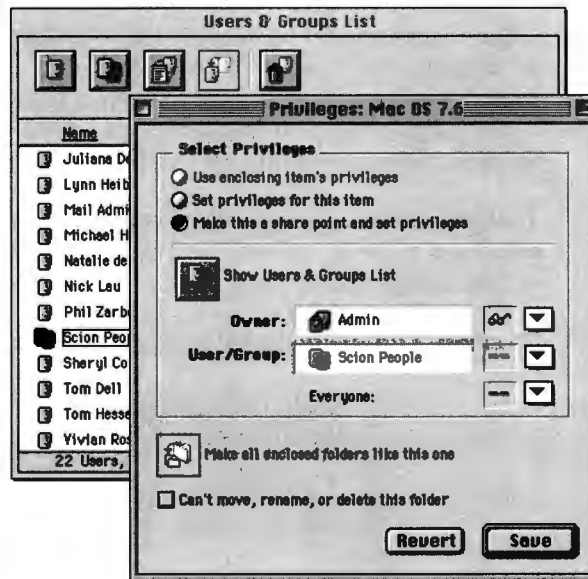


FIGURE 4-50: Assigning a group share point privileges.

Over the years I have seen people use groups many different ways. The most common is to create a group for each department or job function, such as management, accounting, sales, engineering, and so on. At schools, popular group names include administrators, teachers, and students. This works well in most cases, since access privileges differ greatly by function. The people in accounting do not want people from sales digging around in their folders. The teachers want to keep things away from mischievous students.

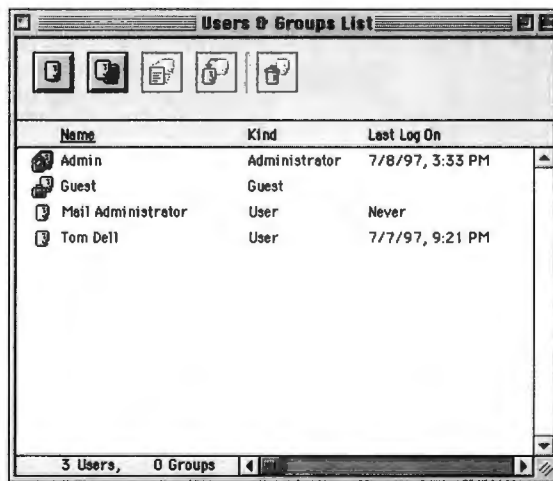
Another method that works well is to create groups for individuals who work together on the same data. This works nicely when individuals from many departments are involved in the same projects.

Some organizations create groups for users of different computer types, such as PowerMac users, 68K Mac users, and PC users. That way, administrators can be assured that users will always run the correct version of the software application being downloaded from the server.

Other organizations create groups for geographic locations, which is particularly useful when a WAN is employed. Users in the “San Francisco” group might have full access to software resident on the local server but not to applications on the server in Tokyo. It would not do to have an uninformed user booting up Adobe Photoshop over the T1, would it?

The groups you create will be unique to your computing environment and the way your users work. You will probably want to create a number of different grouping schemes.

To create a group, begin by opening the Users & Groups List window.



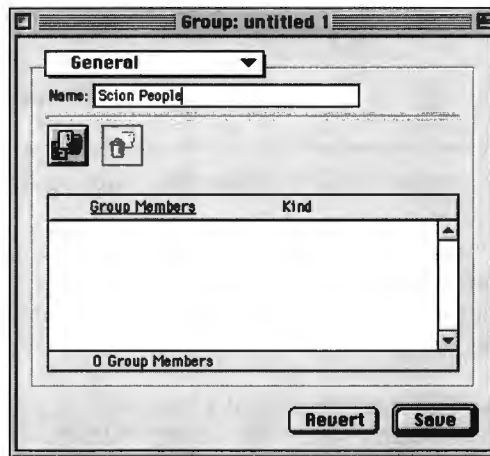
---

FIGURE 4-51: Opening the Users & Groups List.

Next, press the **New Group** button in the upper left of the Users & Groups List (or press the **Command (⌘)-G** key combination).



This opens an untitled Group dialog box with the **General** category selected in the pop-up menu. Here, type a group name in the **Name** field. It can be up to 31 characters long, but should not contain spaces or special characters if you will be running the Mail Server over TCP/IP.

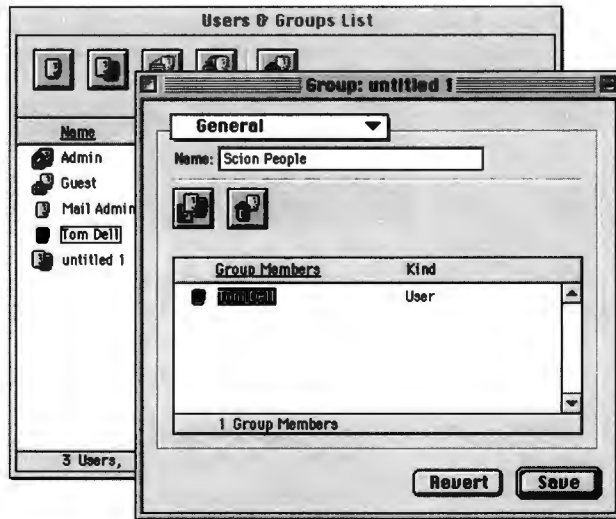


---

FIGURE 4-52: Naming a group.

To add users to your newly created group, simply drag their names from the Users & Groups List into the scrolling field of the Group dialog box.



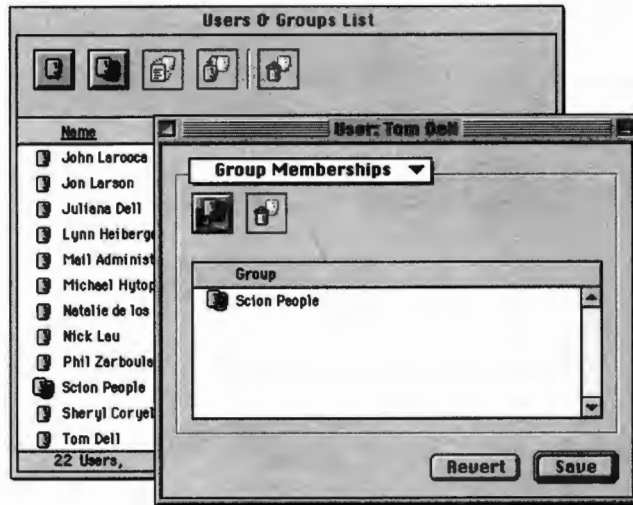


---

FIGURE 4-53: Dragging and dropping users.

Press the **Save** button when you have finished. The next time you want to add a user to this group, simply drag and drop the User icon onto the Group icon in the Users & Groups List. There is no need to open these accounts!

You can also associate a user with a group from within the User dialog box. Simply select the **Group Membership** category in the pop-up menu and drag the appropriate group from the Users & Groups List into the scrolling field.



---

FIGURE 4-54: Viewing users' group memberships.

This also provides you with a list of all the groups in which a user is a member.

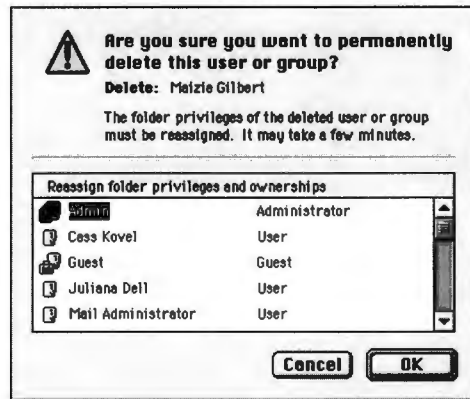
## Deleting Users and Groups

Deleting users and groups is a bit more complicated than just trashing them. Users will create, and therefore own, many folders over time. When you delete a user, someone must take responsibility for all of his or her data.

To delete a user or group, highlight it in the Users & Groups List. Next, press the **Delete Users/Groups** button in the upper left of the Users & Groups List (or choose **Delete Users/Groups** from Web & File Server Admin's **Server** menu bar item).



AppleShare IP will then ask you who should be given access to that user's or group's folders. The default is the administrator.



---

FIGURE 4-55: Naming a group.

Press the **OK** button when you have made a choice, and AppleShare IP will transfer the privileges to the remaining user or group that you specified.

Before you delete any user or group, give this some thought: Who should take over that entity's privileges? In some cases it will seem obvious. One employee leaves and another takes her place; reassign the privileges to that new user. But what if the previous user had personal data in her folders that she forgot to delete? Did you just violate her expectation of privacy?

This seemingly innocuous feature touches on some big issues. Who owns the data on your server, anyway? How much privacy can an employee, or former employee, reasonably expect?

## Working with the Users & Groups Data File

All of the information relating to the users and groups you create, as well as the server's Admin key and serial number information, is stored in the Users & Groups Data File.

You may recall from Chapter 3 that I urged you to back this up. You can imagine what a pain it would be to have to re-create one of these. As long as you have a backup somewhere, you can always replace a damaged copy of the file on your server. Make backups often!

### Exporting and Importing Users and Groups

Once you have your users and groups established, you can export the information from your Users & Groups Data File as a tab-delimited text file to import into other AppleShare IP servers, spreadsheets, or databases.

To begin, open the Users & Groups List and select the users you wish to export. You can select multiple users nonsequentially by holding down the **Command (⌘)** key when you click on them.

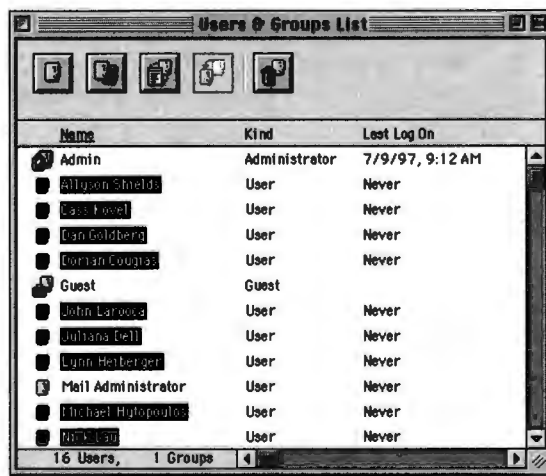
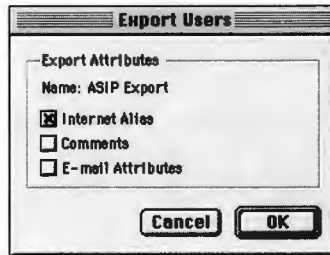


FIGURE 4-56: Selecting multiple users with the Command key depressed.

Next, choose the **Export Users and Groups** command from the **File** menu bar item. When the Save File dialog box appears, name the export file and press the **Save** button. The Export Users dialog box will then appear.



---

FIGURE 4-57: Choosing which attributes to export.

If you want to export data in addition to users' names, select the appropriate checkbox here. (If you choose to export the email attributes, you must also select the **Internet Alias** checkbox.) Press the **OK** button when you have done this.

The file that is created can be opened with SimpleText or imported into a spreadsheet application such as Microsoft Excel or ClarisWorks.

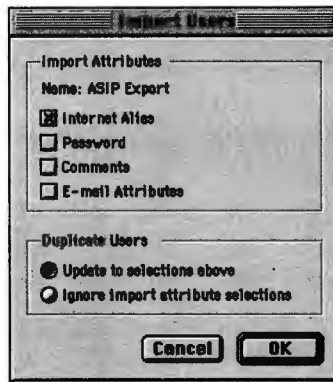


---

FIGURE 4-58: The exported user names and Internet aliases.

Not included in this file is any information about the groups these users belong to or the access privileges they possess. Nevertheless, it is enough to ensure that you have consistent spellings of names across all of your servers.

To import such a file into AppleShare IP, select the **Import Users** command from Web & File Admin's **File** menu bar item. When the File Selection dialog box appears, choose the file and press the **Open** button.



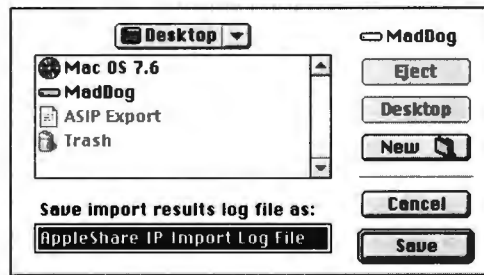
---

FIGURE 4-59: Choosing which attributes to import.

You will be asked which attributes are in the file in addition to user names. If a user already exists in the Users & Groups Data File of the server to which you are importing a new file, his other attributes will be updated by the information in the imported file. If you do not want this to happen, select the **Ignore import attribute selections** checkbox. Then only users who do not appear in both places will be imported.

Select the appropriate checkboxes, and then press the **OK** button. (Note that the **Import Users** command allows you to import passwords that have been added to the text file, even though the **Export Users and Groups** command does not export user passwords.)

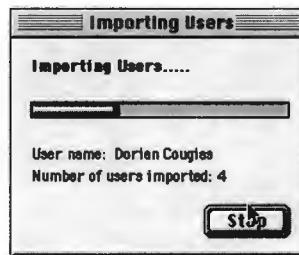
Before proceeding, AppleShare IP will ask you where it should put a log file it keeps of the import process. This log contains detailed information about the imported users and their attributes, as well as any errors that may have occurred during the import.



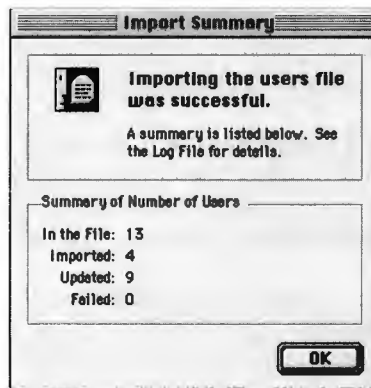
---

FIGURE 4-60: Saving a log file.

Choose a location and press the **Save** button. The import process will then begin.



When it is completed, AppleShare IP will report its success with another dialog box.



---

FIGURE 4-61: Import Summary dialog box.

This feature works not only with export files that originated from AppleShare IP but with imported tab-delimited text files created from any program, so long as the field order is maintained. That means you can bring over user information from other non-AppleShare—even non-Mac OS—servers.

You can also import the users you may have saved in an AppleShare 3.x / 4.x report (as we did in Chapter 3). This is not a perfect solution, since it will not import user privileges and confuses group names with those of users. However, it will ensure that you spell everyone's name right! You can tweak the file if you want to add passwords, Internet aliases, and so on.



---

*Note: If you have multiple AppleShare and AppleShare IP servers, the best way to do this is with Santorini's Server Manager, covered in Chapter 9.*

---

## BASIC FILE SERVER ADMINISTRATION

At this point you should understand how to create users, groups, and share points—essential tasks in setting up the AppleShare IP server. Beyond that are a few other administrative tasks you will need to know to keep the server running well from day to day.

### Monitoring File Server Usage

The file server's minute-by-minute workings can be seen in the Web & File Server Activity window, which is accessible from Web & File Admin. Here you can find lots of critical server information quickly.



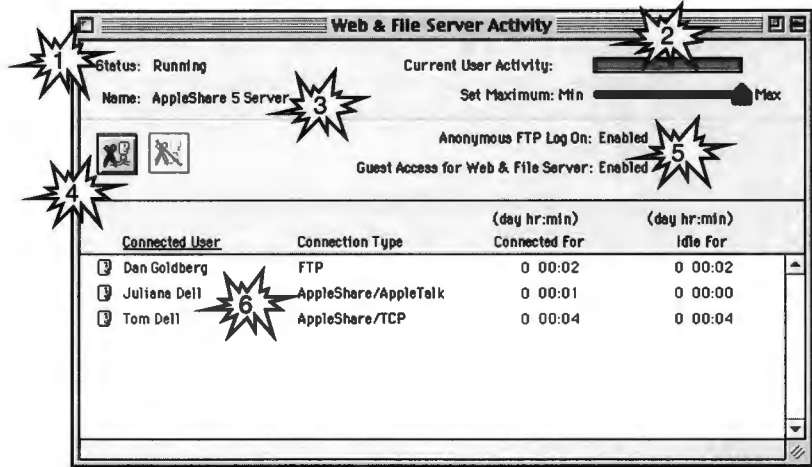


FIGURE 4-62: Features of the Web & File Server Activity window.



The Status line tells when the Web & File Server is starting up, running, shutting down, or not running at all.



The Current User Activity bar tells you how much of the server's processor time is being spent on users' requests for reading and writing files. You can alter this setting by moving the **Set Maximum** lever.



The Name line tells you the server's name as it appears in remote computers' Choosers.



The first **Disconnect** button is used to kick a user off the server. The second button can be used to cancel the disconnect command.



As I mentioned earlier, the **Guest Access for Web & File Server** and the **Anonymous FTP Log On** lines tell you when nonregistered users are being allowed or denied server access.



The main pane of the Web & File Server Activity window displays the names of users who are currently connected and how long they have been connected (in days:hours:minutes), and how long users have been idle. These users may connect in one of three ways:

- **FTP:** using an FTP client such as Fetch to connect to the Web & File Server over TCP.
- **AppleShare/AppleTalk:** using any AppleShare client to connect to the Web & File Server over classic AppleTalk.
- **AppleShare/TCP:** using AppleShare Client version 3.7 or later to connect to the Web & File Server using AppleTalk over TCP.

Web users do not show up here.

Many of these indicators can also be viewed in Web & File Server's windows.

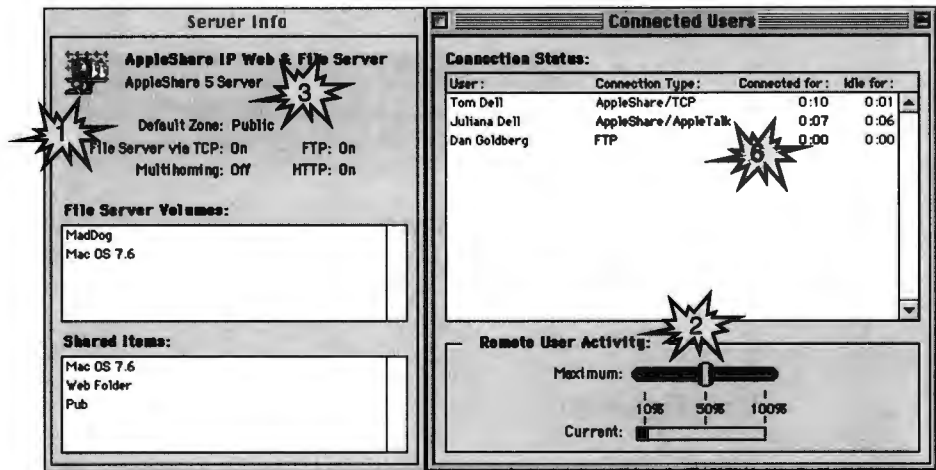


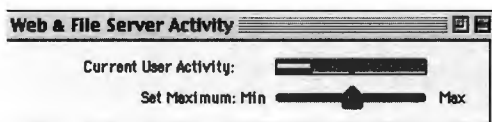
FIGURE 4-63: Features of the Web & File Server's Server Info and Connected Users windows.

The Server Info window does not tell you when the server is stopped because, in that event, this window would not be available! It will tell you what zone the server is in, however, and when FTP, HTTP, AppleTalk/TCP, and multihoming are available. You can also see the volumes installed on the server and their share points.

The Connected Users window tells you who is connected and how, but it does not let you disconnect anyone. It lets you adjust the amount of processor power remote users can commandeer from the server's CPU.

## Maxed Out

One of the things that you will want to keep an eye on here is the amount of sustained user activity. If you see that the Current User Activity indicator is constantly pegged to its maximum setting, you may need to adjust the **Set Maximum** lever upward. If it rarely reaches its maximum setting (as indicated by a red line) and you have other services running on the server, you might want to move it down.

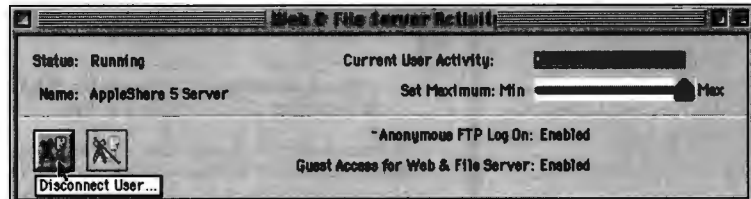


If you have moved the **Set Maximum** lever all the way to the right and you still “redline it” regularly, it is probably time to deploy another file server and begin load balancing between the two.

## I’m Tickled!

Another thing you should watch out for is the number of idle users—people who have mounted a shared item on their desktops and are not using it. This is a problem for two reasons. First, idle mounted volumes generate unnecessary network traffic. AFP constantly sends out “tickle” packets to verify that the connection between client and server is still in place. Second, they pose a security risk. If a user is away from a desktop computer and leaves a server volume mounted, some unauthorized person can conceivably sit down and start rummaging through your server.

To eliminate the threat of idle users, simply select their connections in the Web & File Server Activity window and press the **Disconnect** button.



This will open a dialog box in which you can tell the person why you are doing this and even give them some time to log off (up to 4,094 minutes, or 68 hours!)



---

FIGURE 4-64: Logging off an idle user nicely.



*Note: On a couple of occasions, I have used this feature of AppleShare to spot "unauthorized users." If you glance at the server and see that Joe Bob is logged in, but you know Joe Bob is vacationing in Bali, you might want to log Joe Bob off and investigate. Just drop him a little note like:*



---

FIGURE 4-65: Gentle admonishment to a suspected hacker.

*If you are very lucky, you will be able to walk up behind the hacker before he finishes reading this. If you are very unlucky, you will find out that your boss was using Joe Bob's account because he forgot his password.*

---

## Shutting down Service

You can bring down the server, perhaps for service, by choosing the **Stop Web & File Server** command under Web & File Admin's **Server** menu bar item (or by pressing the **Command (⌘)-J** key combination). Before doing so, you will need to log off all of its users whether or not they are idle. Therefore, when you choose this command AppleShare IP will present users with a dialog box telling them that the server will be shutting down in 10 minutes. You may adjust the actual delay to between 0 and 4,094 minutes and create your own message. However, FTP users, Web site browsers, and some non-Mac OS users will not receive the shut-down message.



---

FIGURE 4-66: Warning users that the server is shutting down.

I recommend that you never set the delay to zero. If you do, users who are working at the time will lose any information they have not saved locally.

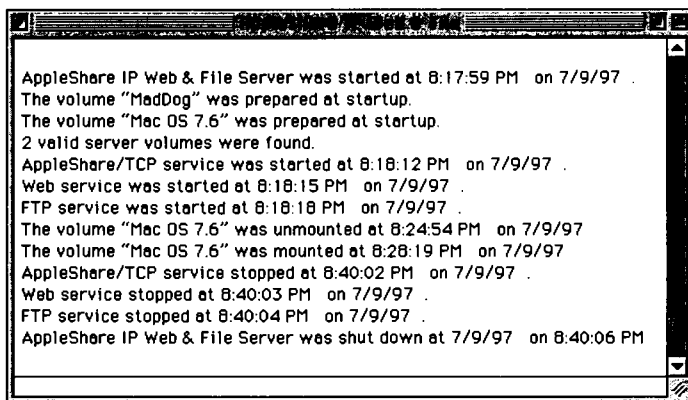
After you press the **OK** button, the Web & File Server Activity window shows the status of the server as shutting down in however many minutes. If the time delay you chose is greater than an hour, the warning will be repeated at the desktop computers once an hour until the final hour. After that, it will be repeated every 10 minutes, then at five minutes, then at two minutes, and then at one minute. If that does not annoy people enough to make them log off, nothing will. Also, nobody can log on to the Web & File Server during the final five minutes (except Web users).

To abort the process, select the **Cancel Web & File Server Shutdown** command from Web & File Server Admin's **Server** menu bar item.

## Viewing the Server Log

In addition to what you can see in the Web & File Server windows, AppleShare IP maintains a log of significant events, such as when the Web & File Server started up or shut down. This information is kept in

the “AppleShare IP Web & File Log” (located in the “AppleShare IP Preferences” folder in the Preferences folder of the System Folder).



---

FIGURE 4-67: Viewing the AppleShare IP Web & File Log.

This text file can be viewed by any text-processing application that can read ASCII, such as SimpleText, ClarisWorks, or Microsoft Word.

They could have made this file a little easier to get to! I recommend that you make an alias of it to keep on your desktop or under the **Apple** (🍏) menu bar item.

## Unmounting Removable Disks

AppleShare can share both fixed media, such as internal hard drives, and removable media, such as CD-ROMs. Under AppleShare 3.x/4.x, switching a CD-ROM involves launching AppleShare Admin, “unsharing” the disk, and then ejecting it. Under AppleShare IP, you can do it more easily from Web & File Server Admin: Highlight the CD-ROM in the Disks & Share Points window, then select the **Unmount Disk** command from the **Server** menu bar item. Any users who were connected to the CD-ROM will be disconnected, and the CD-ROM will be unmounted and ejected.

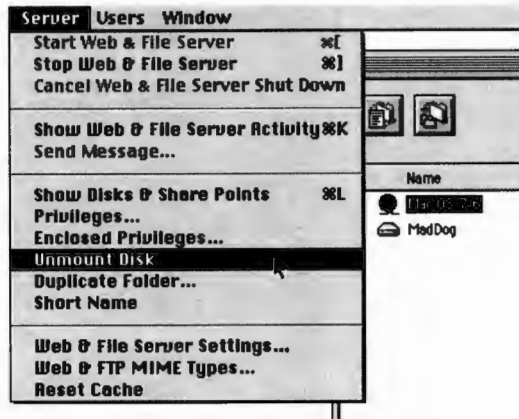


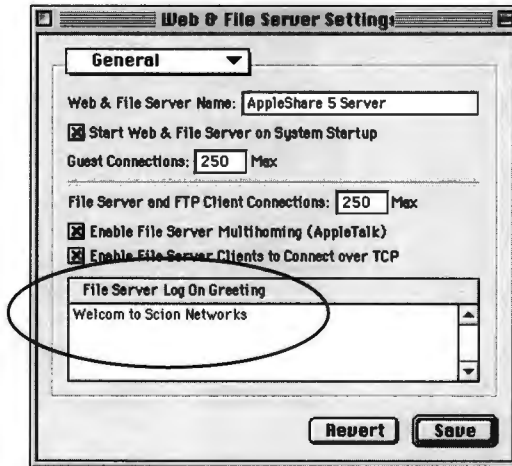
FIGURE 4-68: Unmounting a disk (without unsharing).

To remount the CD-ROM, put it back in the drive. It will be shared automatically.

## Setting a Greeting

If you want people to be greeted by a message dialog box when they log in to the file server, type something in the **File Server Log On Greeting** field under the **General** pop-up menu in Web & File Server Admin's Web & File Server Settings dialog box.

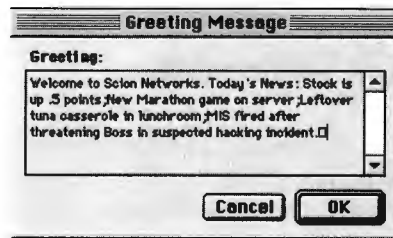




---

FIGURE 4-69: Setting a login greeting.

You can be creative with this. How about a daily news summary?



---

FIGURE 4-70: Greeting with the day's news.

In general, users hate this feature because it generates yet another screen that must be dismissed. Even so, it does have its purposes.

I was training a Webmastering class in Virginia recently when the topic of server security came up. One of my students related a story he had heard from someone at the National Security Agency. Apparently, a clever hacker had breached the security of one of the government's big hosts and been caught. In court, his lawyer argued that the hacker did not

know he was doing anything wrong. While he was trying various logons, there was no indication that the target server was off-limits to him. Indeed, when he found the logon that worked the host responded with "Welcome to Hewlett-Packard!" It invited him in!

This story may be no more than rumor, but it makes a great point. I know for a fact that when you attempt to log on to many government hosts now, you are presented with a very specific explanation of how unauthorized access is illegal and what dire consequences will ensue should you proceed.

If security is paramount at your organization, you might want to use the greeting as a warning to hackers or as a reminder to users.



---

FIGURE 4-71: Using the greeting as a security notice.

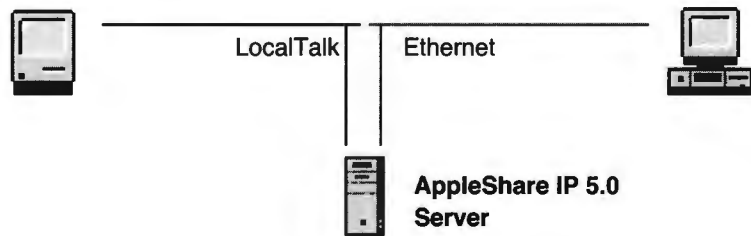
This message is visible only to users, but you can make similar messages for FTP users by modifying the text files in the "FTP Preferences" folder (inside the "AppleShare IP Preferences" folder, which is inside the System Folder's Preferences folder). These messages are:

- **FTP Connect:** seen by users when they establish the FTP connection.
- **FTP Login:** seen by those who log in with a user account.
- **FTP Anonymous Login:** seen by those who log in via Anonymous FTP.

Each file can contain up to 31 lines, and each line should be no more than 80 characters long and end with a carriage return to make it compatible with most FTP clients. Modifications will take effect after you restart the Web & File Server.

## Enabling Multihoming

As I mentioned in Chapter 3, your PCI-equipped server can provide AppleShare file sharing to as many as four network segments at once. For example, if you have an Ethernet network and a LocalTalk network, your server can reside on both. Simply attach one network cable to a LocalTalk port (Printer port) and another to an Ethernet port.

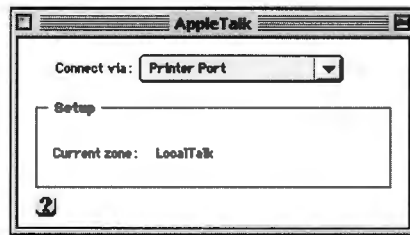


---

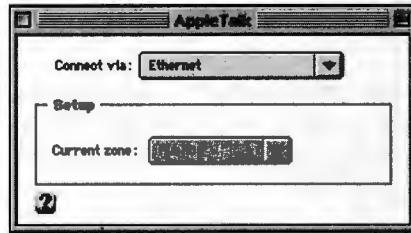
FIGURE 4-72: Multihoming on Ethernet and LocalTalk networks.

AppleShare IP services should not be running when you set this up, so stop them if they are. Likewise for any other network services.

Next, open the AppleTalk control panel and choose **Printer Port** (LocalTalk) from the **Connect via** pop-up menu. Also choose a zone in the **Current zone** pop-up menu.

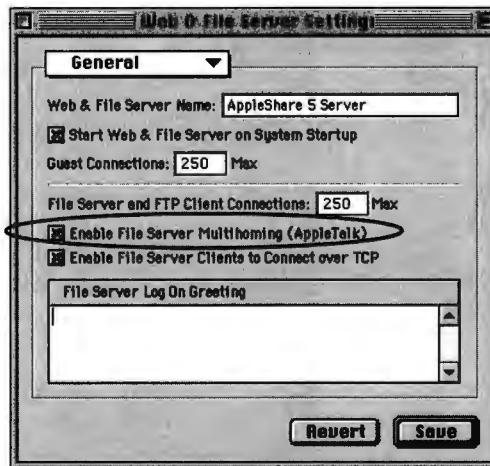


Do the same thing for the Ethernet port, but make sure to choose a different zone.



Now you may close the AppleTalk control panel and save the changes.

Next, select the **Enable File Server Multihoming** checkbox under the **General** pop-up menu in Web & File Server Admin's Web & File Server Settings dialog box. When you start the Web & File Server again, it will register itself on both networks.



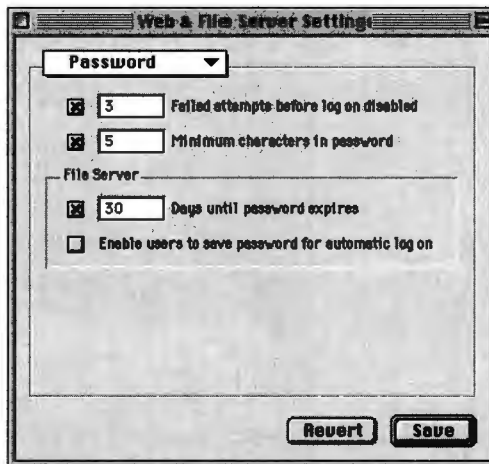
---

FIGURE 4-73: Enabling multihoming.

## Setting Password Policy

You can allow people to connect to an AppleShare server without passwords, but it is a bad idea in all but the most secure workgroups. If your network is connected to the Internet, failure to use good passwords is just plain nuts!

Password protection is your server's first and best line of defense against intrusion, data theft, and vandalism. Good passwords—alphanumeric codes that are hard to guess—can eliminate the threat from all but the most determined hackers. To enhance this protection, AppleShare provides you with several controls on password policy. To set these, choose **Password** in the pop-up menu of Web & File Server Admin's Web & File Server Settings dialog box.



---

FIGURE 4-74: Setting password restrictions.

Enable the **Failed attempts before log on disabled** checkbox, and you can limit the number of tries someone gets to guess the password of a user account before AppleShare disables that account. I recommend that you set this restriction for 3.

On the downside, registered users sometimes make mistakes (usually because the **Caps Lock** key is down) and disable their accounts themselves. When that happens, you need to reinstate the accounts by enabling the **User may log on** checkbox (see Figure 4-45). On the upside, hackers employing “war dialing”—trying dictionaries full of possible passwords—will get just three shots at it before losing their access and alerting you to their attempt.

If you enable the **Minimum characters in password** checkbox, you can require people to use passwords between one and eight characters long. It is generally accepted that passwords should be longer than four characters: The longer they are, the harder they are to guess.

This feature applies only to people who log on over AppleTalk or via a POP client such as Claris Em@iler. When users attempt to change their passwords, they receive a message that a longer password is required if theirs is shorter than the required minimum. Unfortunately, some non-Mac OS clients will not receive notification that a longer password is required. Also, this does not affect passwords that were created before you set the restriction.

An old password is the same as no password at all. After people have tacked them up on their monitors, emailed them to each other, and holstered them across the room, passwords can no longer be considered secret. Enable the **Days until password expires** checkbox, and you can require people to change their passwords regularly. Type in the number of days to elapse before passwords must be changed. I recommend no longer than 90 days.

This restriction applies only to those who log on via AppleTalk. It does not affect FTP users, and the Mail Server allows users to connect even when their passwords expire. Also, some non-Mac OS clients may not receive notification that the password needs to be changed.

Finally, if you select the **Enable users to save password for automatic log on** checkbox, users will be able to mount volumes on their desktops at startup without entering passwords. It is far more secure to disable this ability so that passwords must always be entered.

## Serialization

The number of people who may log on to your AppleShare IP server at the same time depends on your license. You can increase the number by purchasing additional serial numbers that allow additional concurrent user connections. Your initial serial number is printed on a card that comes in the AppleShare IP box.

When you purchase additional serial numbers, you will get additional cards. To enter the numbers from these cards, open Web & File Server Admin's Web & File Server Settings dialog box, and choose **Serialization** in the pop-up menu.



FIGURE 4-75: Adding serial numbers.

Next, press the **Add Serial Number** button to type in the numbers. Under the Max Connections column, you will see how many concurrent user connections are allowed under your current license.

## ADVANCED FILE SERVER ADMINISTRATION

In the previous section, I described most of AppleShare IP's vital file server management components. These are integral to the product and will meet your basic needs. However, there are a couple of add-on products that I believe AppleShare managers should know about. The first is a suite of advanced utilities from Santorini Consulting & Design. These server tools bring to the Mac OS a level of server management more commonly found on other platforms. The second is Retrospect, the full-featured backup software from Dantz Development that I first showed you in Chapter 3. With Retrospect, you can copy data from both your server and remote desktop computers using either AppleTalk or TCP/IP.

Among other things, these products can greatly enhance your server security, and that's always good for enhancing your peace of mind.

### Santorini's Server Management Software

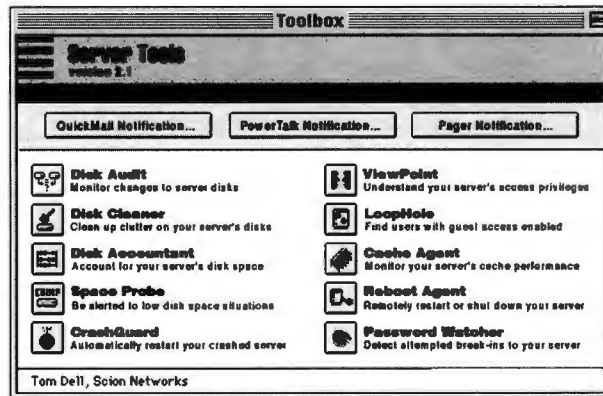
In addition to creating user accounts and administering their access privileges, one of your tasks as an AppleShare manager should be to track and analyze server usage. With the right information you can ensure that users get the most out of available resources—an important goal. Depending on your organization, it may also be your responsibility to “bill back” users and groups for their fair share of server operations. Finally, you need to be aware of how the server is being used so that any unauthorized activity, such as that of an Internet hacker or a malicious employee, can be detected and halted.

Advanced server management requires information gathering that AppleShare IP was not designed to perform. Fortunately, a third-party software developer created a suite of products to fill the niche. Server Tools, ServerTracker, and Disk Quota, all from the company that created Server Manager (see Chapter 9), reports everything you might conceivably want to track. Better still, it does it on a schedule, automatically informing you of its findings via email or pager.



## Server Tools

The Server Tools Toolbox gives you access to all of its components in much the same way that AppleShare IP Manager does with AppleShare IP's parts. However, unlike AppleShare IP, Santorini's software is not based on OpenDoc.



---

FIGURE 4-76: Using ServerTool's main console, the Toolbox.

The Toolbox also acts as a gatekeeper for messages coming from Server Tools modules to you. It is capable of forwarding these messages using CE Software's QuickMail, Apple's PowerTalk, or ExMachina's Notify! pager gateway. For convenience, Server Tools comes bundled with PowerTalk, which, when coupled with StarNine's Internet Mail gateway (also included), can communicate through your AppleShare IP Mail Server.



---

*Note: PowerTalk is no longer supported by Apple and is not compatible with Mac OS 7.6 and later.*

---

Most of Santorini's server management software can be used with both AppleShare 3.x/4.x and AppleShare IP. In some cases it can also be used with Personal File Sharing.



**Disk Accountant.** Using Disk Accountant, you can see who is using what amount of disk space on your server and whether applications or documents are the source of that use.



**Disk Audit.** Using Disk Audit, you can detect changes that have taken place on a server's hard drive between one time and another. This will tell you what has been created and what has been deleted most recently.



**Disk Cleaner.** With Disk Cleaner, you can move or remove useless and corrupted files that accumulate on your server's hard drives over time.



**Space Probe.** Space Probe has two parts. The first will notify you when hard drive space is running low in time for you to take corrective measures. The second, called Disk Inspector, can be used to create a detailed view of the hard drive's folder hierarchy.



**Password Watcher.** Password Watcher keeps an eye out for suspicious user logons and alerts you when someone might be trying to gain unauthorized access.



**ViewPoint.** ViewPoint can give you a comprehensive look at what resources various users may access on your server's hard disk and by what associations these privileges have been derived.



**LoopHole.** With LoopHole, you can scan for potential breaches in your network's file sharing security by hunting for occurrences of guest access.



**CrashGuard.** CrashGuard automatically restarts the server after it crashes or freezes.



**Remote Reboot.** This tool has two parts: Reboot Agent goes on the server, and Remote Reboot is installed on a remote desktop machine. Together they allow you to restart or shut down the server from across the network. Remote Agent can also be programmed to shut down and boot the server according to a schedule.



**Cache Register.** Like Remote Reboot, Cache Register has a server-based and a console-based component. It is used to optimize the Apple-

Share RAM cache. This is a very handy tool for use with AppleShare 4 and Pro servers, which do not use caching dynamically.



**ServerTracker.** This powerful application records all major file operations, as well as the time they occurred and who performed them.



**Disk Quota.** Disk Quota allows you to restrict the amount of hard drive space users can take up with the folders they own. When they exceed the limits you set, you can direct Disk Quota to notify them to remove their write privileges, or even to disable their accounts.

Disk Quota and DiskTracker are purchased separately and can be used independently of the main Server Tools package.

All together, Santorini's server tools can answer a good number of common server administration questions. Here are a few of them.

## Who Is Using the Most Hard Disk Space?

When it comes to server storage, too much is not enough. It is a computing truism that no matter how much hard disk space you have, you will fill it up. Often new storage media are required, but sometimes the chronic problem can be alleviated by better use of the existing space. You can determine which is the case with Disk Accountant.

There are two buttons in the upper left of Disk Accountant's main window. Use the first to generate a list of how many files are in folders belonging to each user and group and how much disk space those files consume.

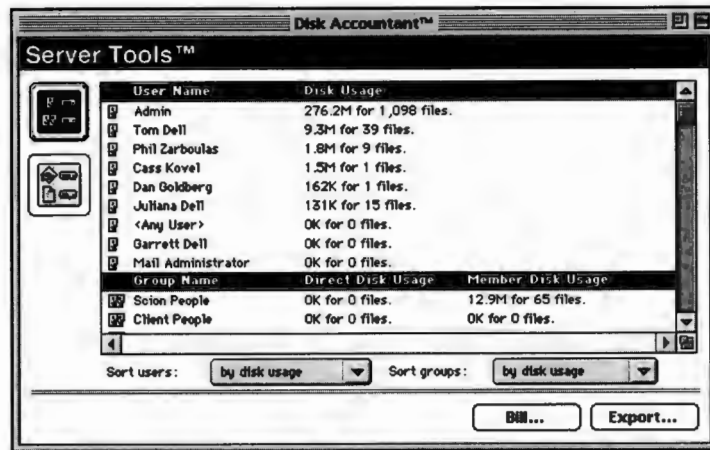


FIGURE 4-77: Tracking hard drive usage by user and group.

The second button in the upper left of Disk Accountant's main window can give you a listing of how much disk space is being consumed by applications.

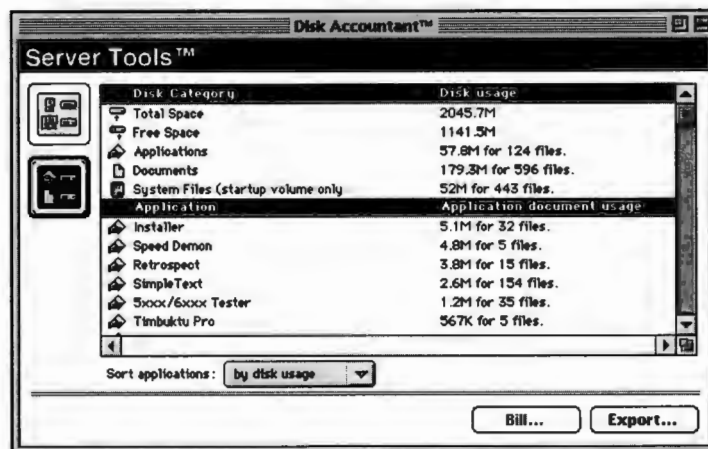


FIGURE 4-78: Determining what applications are being stored on your server.

Suppose that you believe your server is chronically low on hard disk space and you think it is time to upgrade it. Before doing this, you should generate a Disk Accountant report and look for anything unusual.

Imagine that you find that most of your users have less than 10 Mbytes stored on the server, and that mostly in documents. Two users, however, each have more than 500 Mbytes stored there. Much of what they are storing there is applications, which should be run from their desktops' hard drives.

Your first priority should be to talk to the users. You might find that one is copying her whole hard drive on to the server as a backup precaution and the other has uploaded a bunch of CD-ROM games from home. A new server drive might not be required after you reallocate the disk space properly.

You can learn lots of interesting things with Disk Accountant. For example, you may not have known that you had eight copies of Bungie's Marathon on your server. (Naturally, at least *one* is required). Do you really want copies of old applications that are not 32-bit clean—and therefore will not even run on users' computers—hogging your hard drive? Shouldn't you get rid of those copies of software you know to be illegal? (Ahem. That was a rhetorical question.)

Auditing your server via the Finder can take hours and provides you with no documentation. It takes just minutes with Disk Accountant, and you can export the data as tab-delimited text, with optional tracking for user and group bill-back by Mbyte.

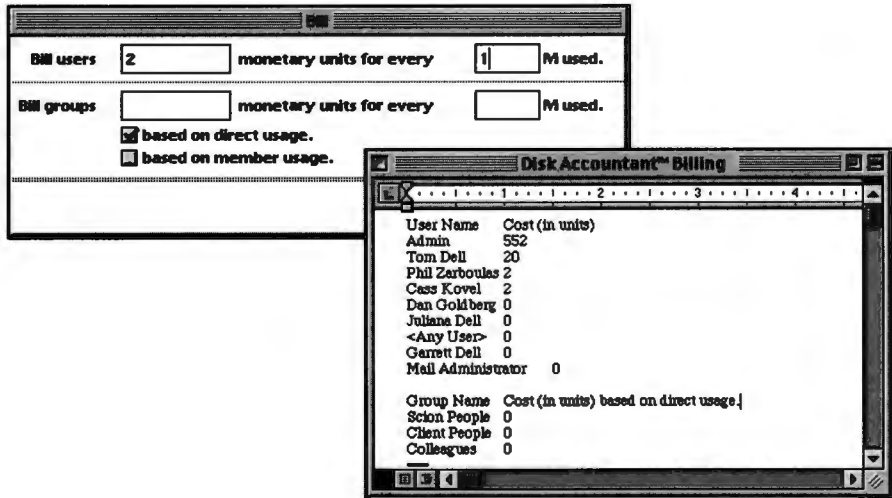


FIGURE 4-79: Billing back users and groups for server hard drive usage.

This type of accounting control is important in any organization, such as a Web hosting enterprise, that makes hard drive space available to the public or to subscribers. The number that you use in the **monetary units** field can be as simple as the per-megabyte cost of the hard drive or the result of a more complicated formula that might include a percentage of utilities used, hardware and software maintenance costs, and personnel salaries.

Even if bill-back is not important to you, it is good to generate these reports regularly anyway. After a while, you will have a good baseline of hard drive usage and can better anticipate when upgrades will be needed. (For example, we are adding about 25 new clients a month, and they each use 10 Mbytes of hard drive space. Therefore, we will run out of space in October.)

This baseline also provides hard evidence for timing purchases of new equipment for a given user or group. (For example, accounting's use of the server increases slowly, and engineering is putting lots of new data on the server. Perhaps we should give engineering bigger workstation drives or their own workgroup server before we upgrade the machines in accounting.)



*Note: Disk Accountant bases its usage statistics on users and groups with explicit ownership of server folders. If your server's folders are all set up with the administrator account as owner—an intelligent choice—all space usage will be attributed to the administrator. You have to give individuals ownership of their own server-based folders for this tool to be useful. Fortunately, whenever users create folders on the server hard drive they are automatically assigned the owner privilege by default.*

## How Many Files on the Server Are Worthless?

Disk Accountant gives you an idea of how much data you might safely remove from your server's hard drive. Disk Cleaner lets you perform the actual removal.

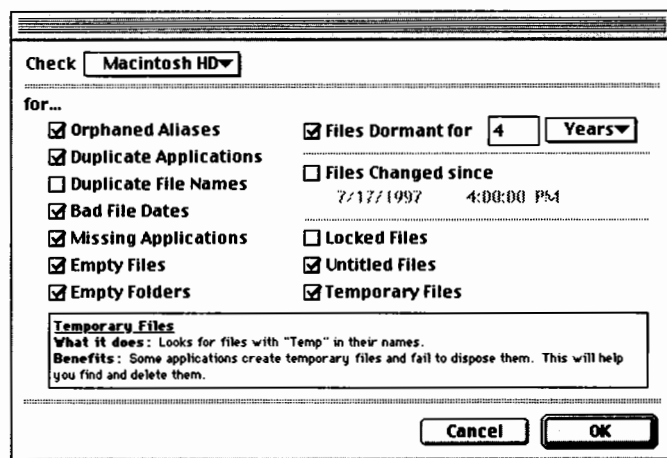


FIGURE 4-80: Locating a candidate for removal from the hard disk.

Over time your server can accumulate hundreds of useless folders and files that hog space and can cause erratic server behavior. Disk Cleaner shows you many of these:

- **Orphaned aliases:** aliases that have lost their targets and will no longer launch them.
- **Duplicate applications:** redundant programs stored in more than one place on the server hard disk.
- **Duplicate file names:** files with the same names as other files, causing confusion and making document version control difficult.
- **Bad file dates:** files with creation or modification dates that are inaccurate (Ever wonder where those files created in 1906 came from?), which confuse synchronization and backup applications, and are often corrupted.
- **Missing applications:** files created by applications that no longer reside on the server, perhaps because they were obsolete and you deleted them.
- **Empty files:** files that contain no data.
- **Empty folders:** folders that contain no files. You might be amazed at how many of these are created by Mac OS novices.
- **Locked files:** some are locked for a good reason, but others are old applications that were not deleted because the people who wanted to get rid of them did not know to hold down the **Option** key while selecting **Empty Trash** to override the locking feature.
- **Untitled files:** called “untitled,” a sure sign that you have novice users on your network.
- **Temporary files:** usually swap files that were not deleted as intended, perhaps because of a severed network connection.

You can search the entire hard drive for these files, or limit Disk Cleaner’s attention to those that have been opened after a specific date, by using the **Files changed since** checkbox. Another option, the **Files dormant for** checkbox, lets you scan for files that have not been opened for a specified period of time and are thus good candidates for archiving.



---

*Note: Be careful here. The modification dates on templates, perhaps the most commonly used documents on your network, do not change.*

---



Disk Cleaner will generate a report of these conditions and then let you make changes to the hard drive. If you need more information about a suspect file, use the **Get Info** button. Otherwise, use the **Delete**, **Copy to**, or **Move to** buttons to remove or relocate files. The **Redirect** button restores the target to an orphaned alias.

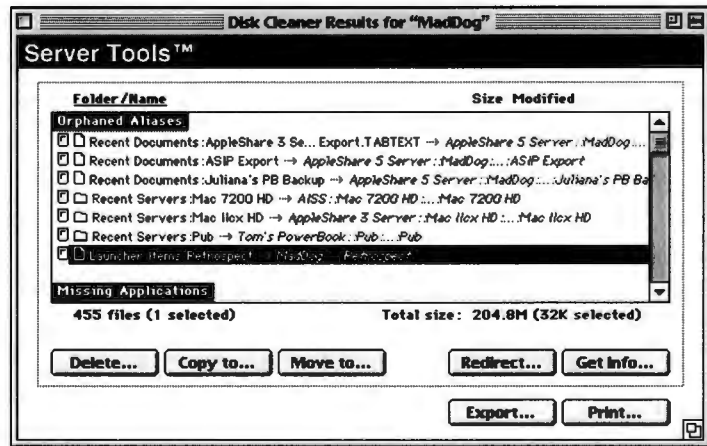


FIGURE 4-81: Redirecting an alias that has lost its target.

Before you use that **Delete** button, I recommend that you apply the **Export** button so that you can email the report to your users and ask for comments. When you delete files that are needed—or perceived to be needed—you make some users angry. If you circulate the report and inform recipients that the files listed will be archived or deleted unless you hear from them by a given date, users can be angry only at themselves if they do not communicate.

## Has Anything Been Added to the Hard Drive?

The tools I have mentioned so far help you analyze overall usage patterns. Disk Audit is a tool that lets you get much more specific by allowing you to take a “snapshot” of your server’s hard drive at various intervals.

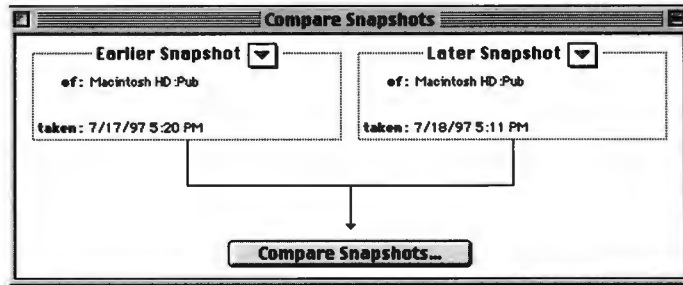


FIGURE 4-82: Taking snapshots of disk usage.

By comparing old and new snapshots, you can determine which files and folders have been added or deleted from the server, as well as which have been moved, renamed, or modified.

Suppose that you decide to enable write privileges on the Pub folder we created earlier so that strangers may upload files to your server. Disk Audit will tell you, on a daily basis, what new files have been uploaded.

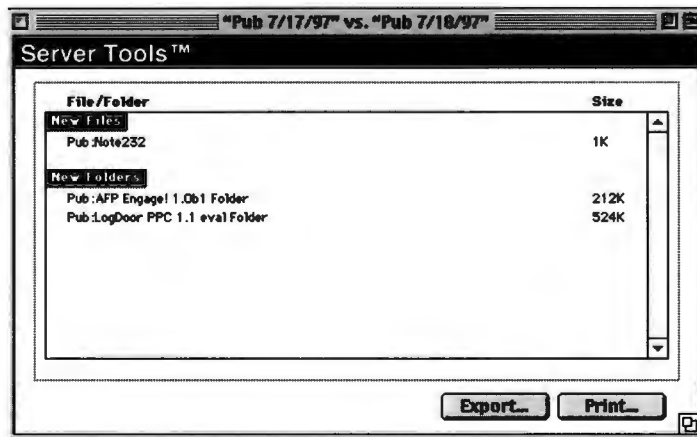


FIGURE 4-83: Comparing disk audit snapshots.

To make it even easier, you can configure Disk Audit's schedule to take the snapshots automatically on a daily basis and then email you the results.

**Schedule Snapshot**

**Disk/folder to take snapshot of:**  
Macintosh HD:Pub

**Save snapshot in:**  
Macintosh HD:Documents

**Options**  
☒ Use File IDs

☒ Repeat every: 1 Days▼

☒ Compare with last scheduled snapshot and mail me the results.

**Time:** 6:00:00 PM  
**Date:** 7/18/1997  
July▼ 1997▼

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Cancel OK

FIGURE 4-84: Scheduling a disk audit to take snapshots automatically.

## How Much Free Space Is on the Hard Drive?

Since the free space on your server's hard drive can dwindle rapidly depending on what users are doing on a given day, it is wise to keep an eye on it. Full hard drives tend to cause crashes. It is easy to watch over a server's hard drive if you are sitting right next to the monitor. It is a good deal harder when the machine is in another room or building. In that case, you can let Space Probe watch over it for you.

With Space Probe's alarms feature, you can set a threshold for how full your server drives get before you are alerted. When usage exceeds that threshold, the Server Tools Toolbox notifies you via email or pager.

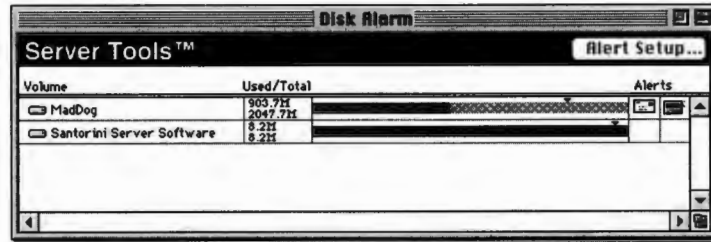


FIGURE 4-85: Viewing the server's hard disk space.

I recommend that you set this threshold at 20 percent. That should give you a reasonable amount of time to add space before your server hard drive is overwhelmed.



FIGURE 4-86: Setting the alert and notification thresholds.

## Did I Give Users Proper Access Privileges?

With a companion to Disk Probe called Disk Inspector, you can get a directory-level view of who has access to server folders and with what privileges. You can also see how big the folders are, when they were last modified, and what their Finder labels are.

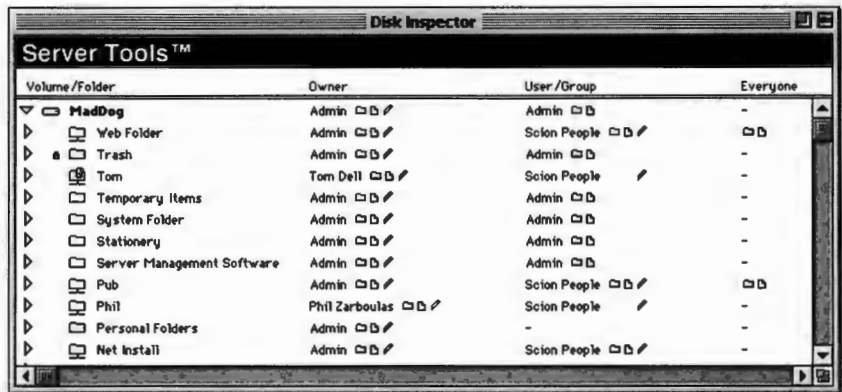


FIGURE 4-87: Viewing access privileges in the folder hierarchy.

Like Disk Accountant, this is a time saver. At a glance you can see where user privileges need to be granted or revoked.



*Note: Here is a cool feature. Enable Disk Inspector's **Show Folder Size** option. This will add a **Folder Size** command to the menu bar and let you generate estimated folder backup times for both LocalTalk and Ethernet!*

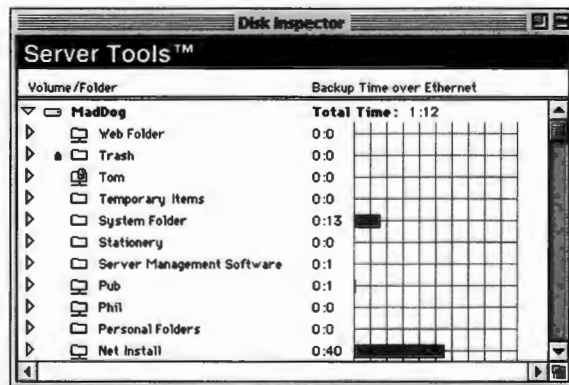


FIGURE 4-88: Estimating server folder backup times.

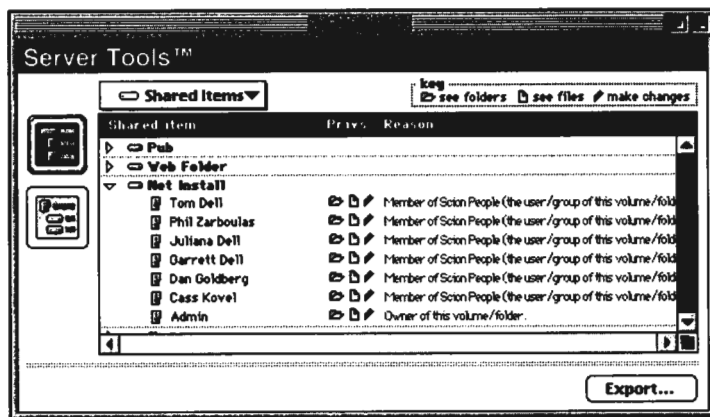


FIGURE 4-89: Viewing privilege categories for each shared item.

ViewPoint gives you another way of viewing server privileges. It shows you which users have access to what on the server and by what association access is made possible. Like Disk Accountant, ViewPoint's main window contains two buttons. The first gives you a read-out on who has privileges in the traditional "see folders," "see files," and "make changes" categories for each shared item. The second button shows you how these privileges appear to users from their desktop computers.

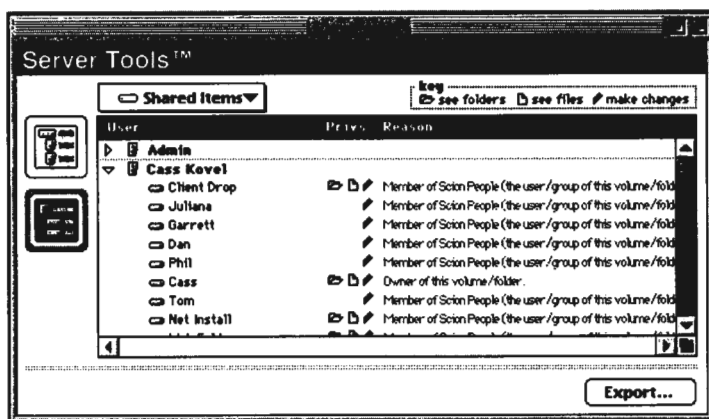


FIGURE 4-90: Viewing privileges as users see them.

With this tool you can quickly identify potential security breaches that may have arisen because inappropriate server access privileges were configured.

Suppose that the accounting department just hired a new receptionist from a temp agency. You give her a user account and, because she works in the accounting department, make her part of the accounting group. In so doing you might not realize that you gave a temporary employee access to the company's confidential financial data simply because she works next to the people who create it. ViewPoint will show you that.

Whenever you add a new user and assign access privileges, run ViewPoint to determine what they can see. Look for any security violations. When you need to remove a user, use ViewPoint to find out what ownership privileges the account has so you can determine who is eligible to take it over.

## **Is the Network Secure from Hackers?**

I have known clients who spend a lot of time and money securing their servers, but then ignore the desktop computers. Meticulously maintaining your server's access privileges will not do you much good if registered users are permitted to copy private data to their workstations and then share those hard drives with Personal File Sharing's guest access.

Using LoopHole, you can tell which AppleShare or Personal File Sharing machines on your network are running with guest access enabled. Run this tool regularly to ensure that people are not accidentally making private data available to the rest of the world.

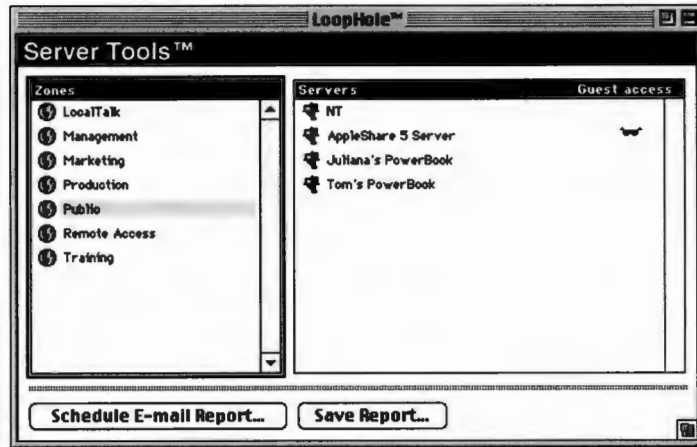


FIGURE 4-91: Looking for guest access.

LoopHole will also tell you exactly what privileges Guests have been given on your servers (in the traditional “see folders,” “see files,” and “make changes” format).

## Is the Server Secure from Hackers?

In the last section, one of the password protections I urged you to implement as a matter of policy was the **Failed attempts before log on disabled** checkbox. (This can be set when you choose **Password** in the pop-up menu of the Web & File Server Settings dialog box.) The goal here is to limit the number of tries someone gets to guess a user's password before AppleShare disables the account. For example, three strikes, you're out!





FIGURE 4-92: Restricting login attempts.

As good as it is, this method is not failsafe. Any skilled hacker will learn from his initial mistake and never trigger this mechanism again. Instead, he will attempt two logons, then quit, then try two more, then quit, and so on. We call hackers who use this method of attack “nibblers.”

Password Watcher spots these attacks. It keeps track of all failed logon attempts and emails the information to you at scheduled intervals. No registered users are going to miss their password all *that* often, so if you see a suspicious number of failed logon attempts you will know that something is amiss.

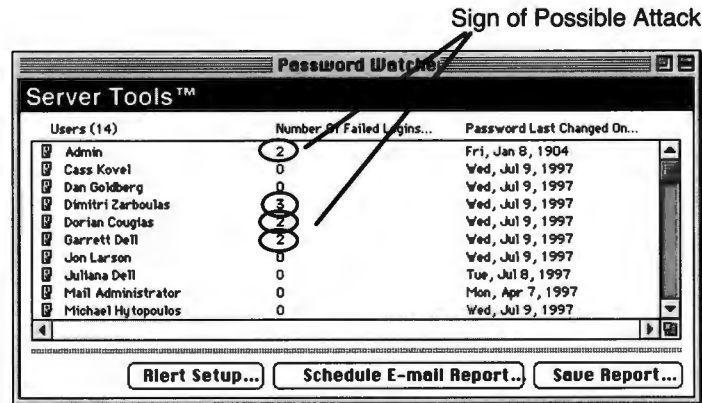


FIGURE 4-93: Detecting hackers by failed logon attempts.

Password Watcher supports another element of your password policy by letting you know if users are changing their passwords often enough. It can send you this information as often as once a minute, giving hackers little time to invade your system. Such a short interval is probably excessive in most organizations. Daily notification should be sufficient.

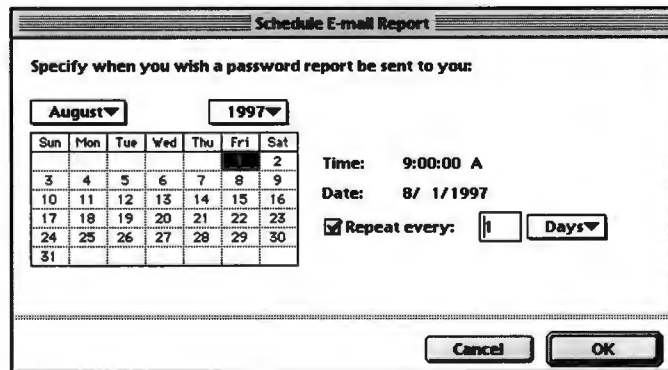


FIGURE 4-94: Setting the polling rate for failed login attempts.

However you set the schedule, make sure to enable the **Clear Failed Login Counters** command under the **Preferences** menu bar item for an

interval greater than the polling rate. That way, Password Watcher will not delete evidence of suspicious activity before reporting it to you.

## **What Has He/She Been up to?**

Suppose that a hacker has gained access to your server despite your best efforts, and has either deleted data from it or uploaded false data to it, and maybe even installed a virus. Or suppose a disgruntled employee has terminated his employment “with malice” and has systematically deleted the files from the server that he knew would hurt your organization most. That is what you have backup tapes for, right? Not exactly.

Backup systems record data with the assumption that you will know what needs to be restored and where. The hard drive crashed, therefore I must restore the hard drive. The user deleted her spreadsheet, therefore I must restore the document.

But what if someone deletes or modifies data in multiple locations? It might take quite a lot of effort to determine what is missing and separate that from what has been legitimately deleted. Even if you restore the entire server hard drive, you will still need to preserve however many files have been created since the last backup. A day’s work? A week’s work? In any case, it means more work for you.

If the hacker has been at it for a long time, your most recent backup will not be as helpful. He might have deleted data a long time ago, beyond the range of your current backup, and it simply has not been noticed yet.

After all is put right, won’t you want to prove who did this?

In this situation you can use the ultimate AppleShare “Big Brother” application, ServerTracker, which watches all server transactions and records the particulars in a log file. This log then gives you an audit trail of who created, deleted, moved, renamed, and opened every server-based folder and file, and when they did it.

## Is the Server Up?

I never saw the real value in CrashGuard until recently. I used to say that a well-configured AppleShare server simply should not crash, and most of the time they do not. When I started setting up Mac OS-based Web servers, however, I found CrashGuard to be invaluable. While AppleShare IP and StarNine's WebSTAR might be rock solid, that is not the case with many of the cool CGIs I want to use.

If your Web server absolutely, positively has to be there overnight, this nifty little tool can save you from a nasty early morning phone call. You can set it to restart the server within a given number of minutes after a system bomb or freeze, and then notify you of the event.



---

FIGURE 4-95: Configuring CrashGuard to restart your server automatically after a freeze.

These are just some of the questions I have been able to answer using Server Tools. You may find many more that are particular to your environment.

## Scripting an Automated Backup with Retrospect

In Chapter 3 I showed you how to create a complete milestone backup of your server's hard disk prior to installing AppleShare IP. Now that you have AppleShare IP up and running, you will need to perform this procedure again—regularly!

I cannot stress enough the importance of regular server backups. I cannot tell you how many times I have had a sullen-faced client say to me "Thank God we had a backup!" I wish I didn't have to tell you about the red-faced clients who have said, "We don't have a backup." Some of those ended up fired. On one level, regular backups save your organization a lot of personnel hours that would be wasted in recreating lost data, assuming it could even be re-created. On another level, regular backups can save that thing you are sitting on.

I believe that you should back up your server at least daily. Fortunately, Dantz' Retrospect makes regular backups easy by automating the process. There are many ways to set up an automated backup script. I will show you my favorite one here. Start with five DATs:

- The first DAT is used to create a milestone backup, as we did in Chapter 3. It is then taken offsite so that if something happens to the office before you get the rest of the way through this procedure, you can still recover. It is also a good test of your Retrospect installation.
- The second DAT is named StorageSet A. On the first day of the schedule (Sunday in my example) it is formatted and used to create a *full* backup. That is, everything on the server's hard disk is backed up. On the second through sixth days of the schedule, it is used to maintain an incremental, or *normal*, backup. This means that only items that are new since the previous day's backup are copied to DAT, a faster process. By the seventh day, I have a full week's worth of server data. I take this offsite for safekeeping.
- The third DAT is named StorageSet B. On the eighth day of the schedule (the next Sunday) it is formatted and used to create a full backup. For the next six days it is backed up incrementally. This tape is taken offsite on the following Saturday.

- The fourth and fifth DATs are named StorageSet C and StorageSet D, respectively, and used the same way: one full backup, six incremental backups, then offsite.
- At last, the first DAT, StorageSet A, is brought back onsite to receive another full backup (which erases its previous contents). The cycle then repeats.

Under this plan, the most data that could be lost if the server hard drive crashed would be one day, the interval since the previous backup. The most that could be lost if the entire office was destroyed would be one week, assuming that the disaster occurred on a Saturday (the interval since the previous StorageSet had been used). Finally, any file destroyed or lost at any time in the previous 30 days would be recoverable.

For added security, I can also slip in a fresh tape for one of the StorageSets every month. That gives me an archive of server data that can span years.

Here is how you would set up this script in Retrospect:

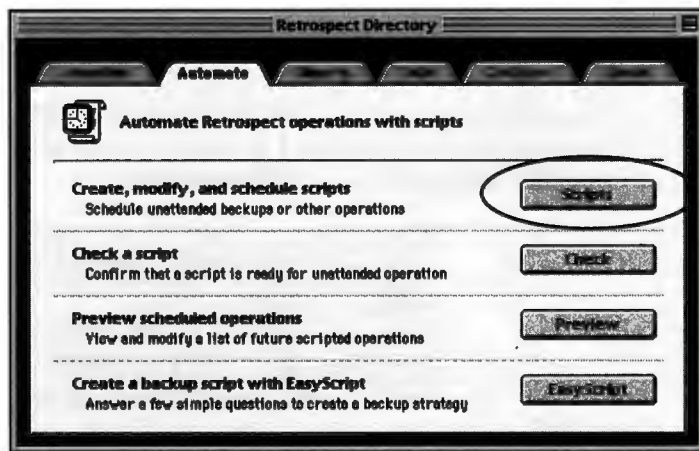


FIGURE 4-96: Selecting the Scripts button.

Launch the application and press the **Scripts** button under the Automate tab in the Retrospect Directory window. This will open the Script Selection window. Press the New button to create a script.

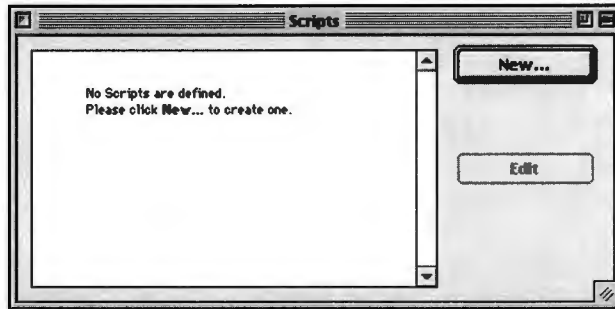
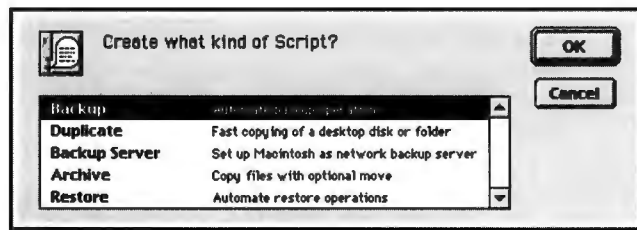
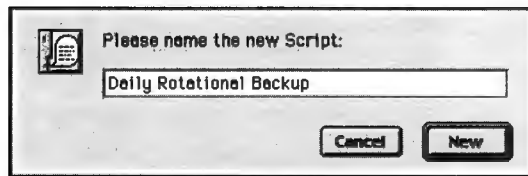


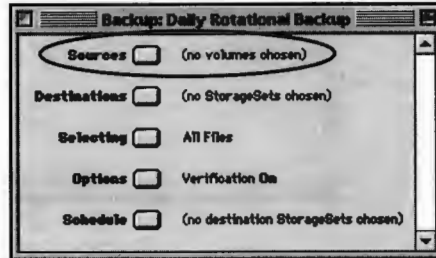
FIGURE 4-97: Creating a new script.



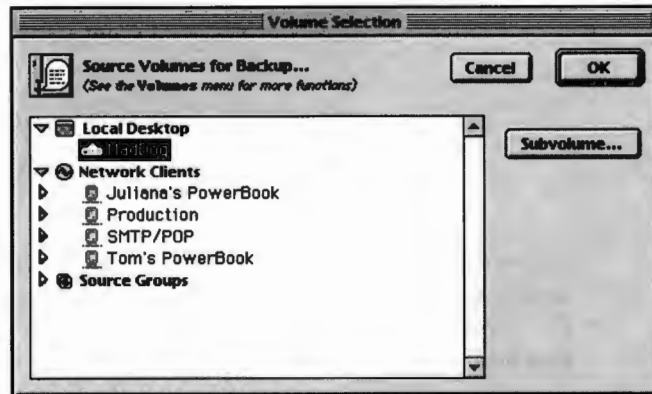
You will be asked what kind of script you wish to create. Choose **Backup** from the list and press the **OK** button. You will be asked to give the script a name. Do so and press the **New** button.



## Sources



As was the case in Chapter 3, the first criterion you will choose is the source of the backup. Press the **Sources** button. Select the server's hard drive in the Volume Selection window and press the **OK** button.

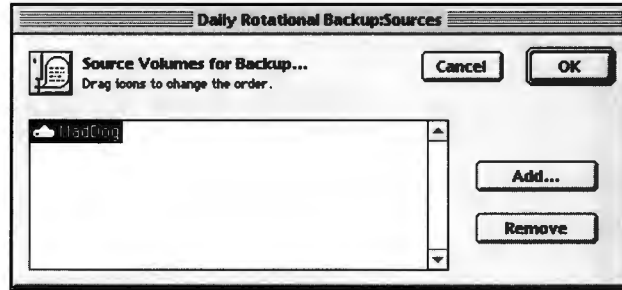


---

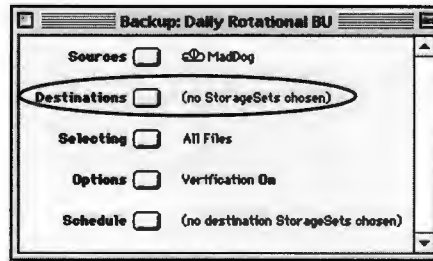
FIGURE 4-98: Selecting the server hard drive.

Confirm that the correct disks were selected when the next dialog box comes up; then press the **OK** button to continue.





## Destinations



Next you will be asked to select the destination of the backup. Press the **Destinations** button. Here you will need to create StorageSets for each of the five DATs. Press the **Create New** button in the StorageSet Selection window to begin.

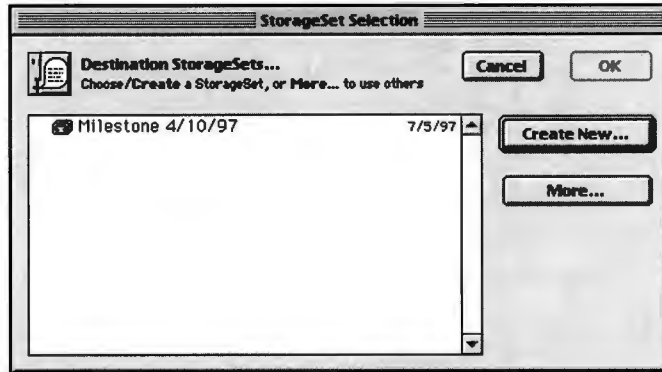


FIGURE 4-99: Selecting Create New in the StorageSet.

In the StorageSet Creation window, make sure that the correct storage type has been chosen and name the StorageSet.

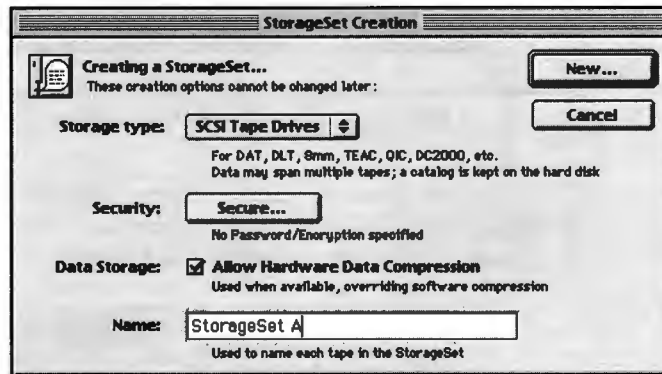
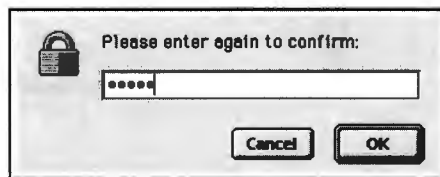


FIGURE 4-100: Naming the StorageSet.



If security is an issue for your organization, press the **Secure** button to establish a password and/or encryption as well. Then press the **New** button. You will be asked where the StorageSet catalog should be stored. I usually select the Retrospect folder.

After you have saved the catalog, the new StorageSet will be listed in the StorageSet Selection window. Repeat this process until you have created all four StorageSets.

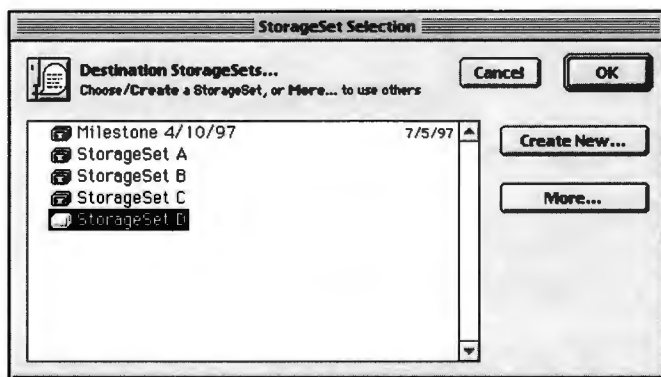
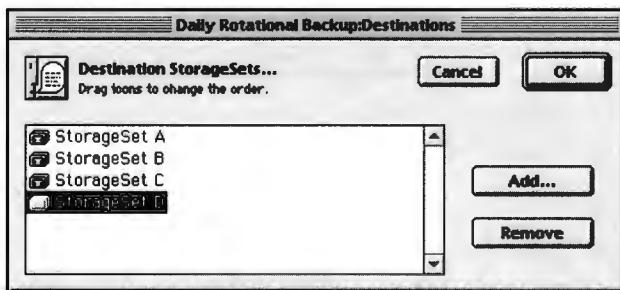


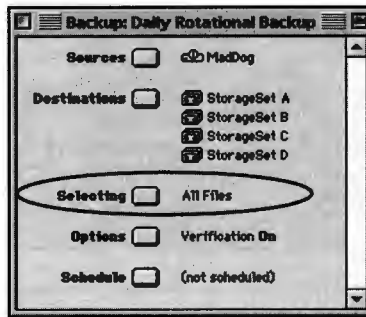
FIGURE 4-101: Viewing the newly created StorageSets.

Press the **OK** button in the StorageSet Selection window when you have finished. Then choose all four StorageSets in the subsequent dialog box, and press the **OK** button here to add them to the script.



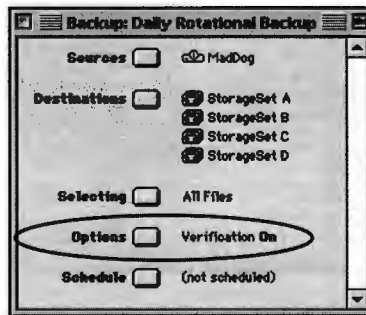
## Selections

Your next task will be to identify the files you want to back up. Press the **Selections** button. The default is **All Files**. I recommend that you keep this.



## Options

Now there are a few procedural options to consider. Press the **Options** button. **Verification On** is chosen by default. This is used to compare backed up data with source data to determine that the duplicate was copied correctly.



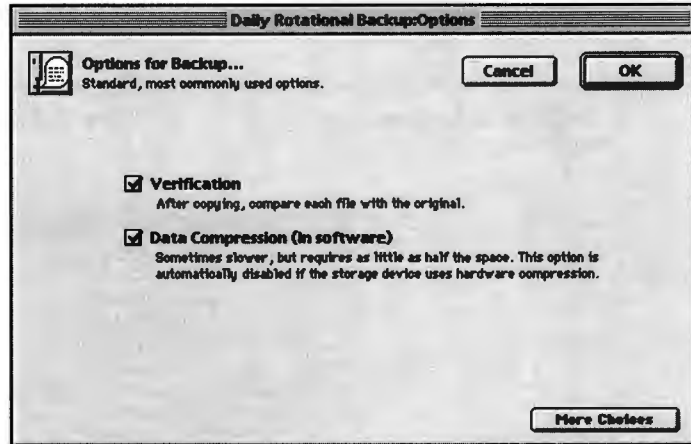


FIGURE 4-102: Selecting the More Choices button.

Next, press the **More Choices** button. Additional options will appear. Select the **AppleShare** item here.

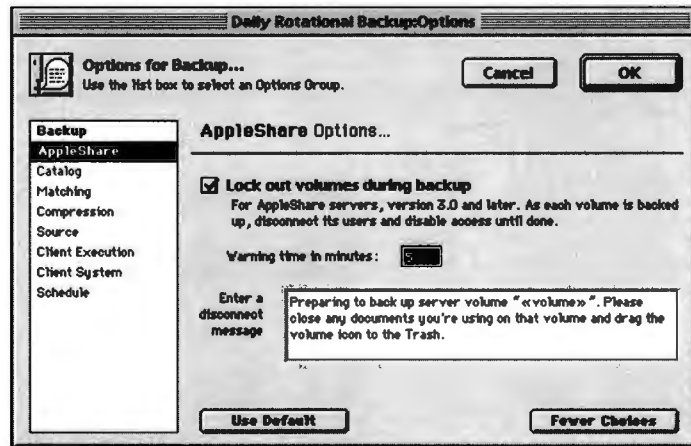
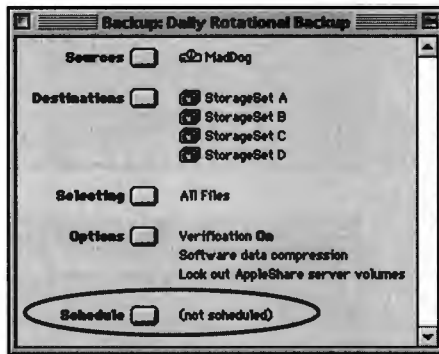


FIGURE 4-103: Locking out AppleShare volumes.

If people have files open on the server when Retrospect executes its script, these files will not be properly backed up. By choosing the checkbox here, you can lock users out of these AppleShare volumes so that data integrity is maintained.

## Schedule



The last step is to establish the backup schedule. Press the **Schedule** button. Next, press the **Add** button to create the first schedule.

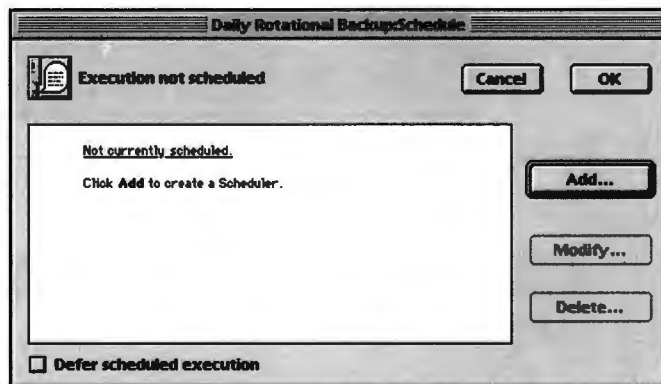


FIGURE 4-104: Creating a new schedule.

You will be asked if this schedule is for a certain day of the week, an interval that repeats, or one time only. Choose the **Day of the Week** option, which will open a window in which you can specify when repeating backups should occur. I want a full backup to occur each Sunday, so I make that the first date. I want it to happen at night when no one is around, so I select 10 P.M. as the time. This StorageSet will be used monthly, so I make four weeks the repeating interval.

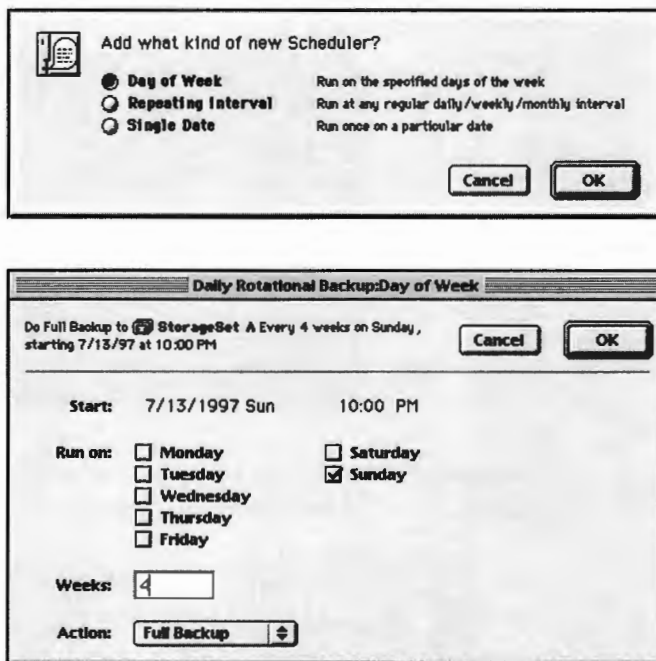


FIGURE 4-105: Scheduling a full backup.

Press the **OK** button when you have finished. The new schedule will appear in the Schedule Selection window. Press the **Add** button and repeat the procedure.

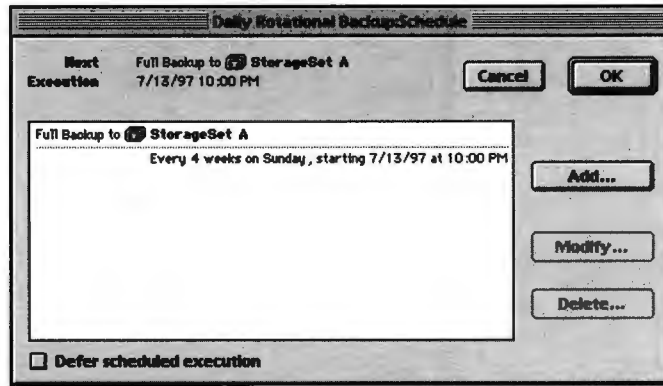


FIGURE 4-106: Full backup schedule.

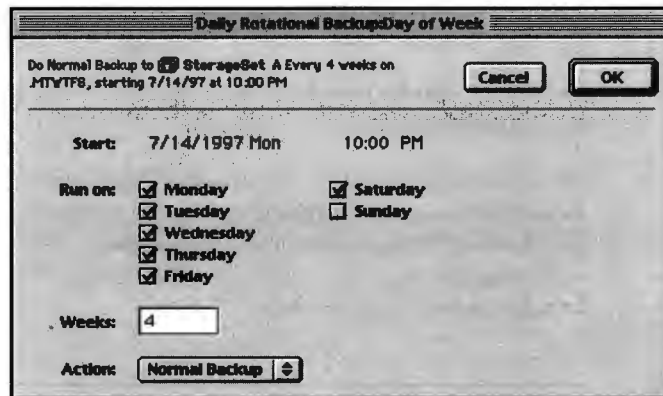


FIGURE 4-107: Scheduling a normal backup.

This time, I want a schedule to handle the normal backups the rest of the week. I begin on Monday and select the checkboxes for Tuesday through Saturday as well. Now I have schedules for all seven days of StorageSet A's run, and that schedule will repeat every four weeks.



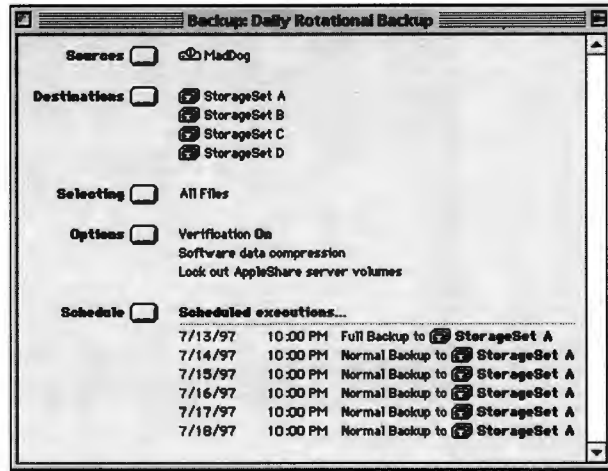


FIGURE 4-108: Schedules in the backup script.

Repeat this procedure for the other three StorageSets. You may then close and save the script.

There are easier ways to do this, but I think this best familiarizes you with Retrospect's scripting functions. If you restart the server computer, Retrospect will enable an extension that permits it to launch itself according to schedule and execute your instructions. Just be sure that the right DAT, or a blank one, is in the drive.



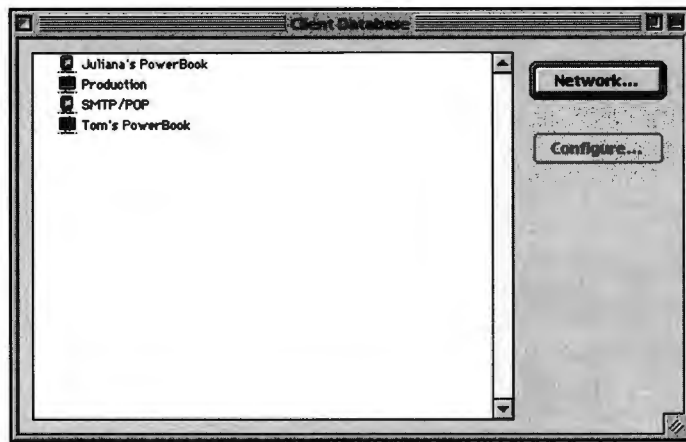
*Note: Dantz is one of those vendors that takes the time to write a good manual. You will find a wealth of information there.*

## Remote Backups

Retrospect is a great application for backing up a server locally. Its real claim to fame, however, is its ability to backup remote computers across

the network, made possible by the Retrospect Client, a small responder application that communicates with the main application on your server.

Using Retrospect Client, you can choose the hard drives of workstations on the network as easily as you choose the server's hard drives. They can be added to the script you just created, and either AppleTalk or TCP/IP can be used to carry the backup traffic.



---

FIGURE 4-109: Viewing Retrospect clients on the network.

This is an option I highly recommend. Why just protect the data on your server when you can protect the whole network?

## Adjust RAM Allocation

Retrospect is designed to operate in a minimum of 2,100 Kbytes of RAM, but because of the large number of files usually stored on a server drive, it often must be given more. This can be done by selecting the Retrospect application and choosing **Get Info** from the Finder's **File** menu bar item. Here, increase the number in the **Preferred size** field.

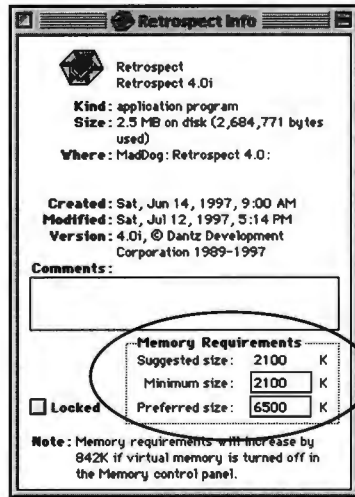


FIGURE 4-110: Adjusting Retrospect's memory allocation.

Dantz recommends the following memory allocations:

Files/Folders	Memory
5,000	2,700 Kbytes
10,000	4,000 Kbytes
20,000	6,500 Kbytes
Each additional 10,000	3,000 Kbytes



*Note: Remember that the server should always be backed up with AppleShare IP running. This preserves the proper folder privileges.*

# IMPROVING FILE SERVER PERFORMANCE

The factors that make a file server “fast” vary with each network environment. The type of processor the server has, the amount of RAM available, and the network topology all play a part. Also important is the amount of processor and network bandwidth available, as well as the number of users who connect concurrently and the types of data they move when connected.

In this section I will show you how to adjust some of these factors in order to optimize file services. First we will look at the basics: adjusting your server’s processing levels, caching, and the number of concurrent connections it supports. Beyond that, I will show you an advanced method for increasing your server’s performance: setting up Apple RAID.

If server speed is paramount to your organization, you will also be interested in RUN, Inc.’s RunShare software. This will be covered in Chapter 12.

## Optimizing Processor Use

You can modify AppleShare’s performance somewhat by adjusting the level of processing power it is allowed to demand from the processor. This adjustment is made with the Set Maximum level available in both the Web & File Server Admin’s Web & File Server Activity window and, as with earlier versions, the file server application’s Connected Users window.

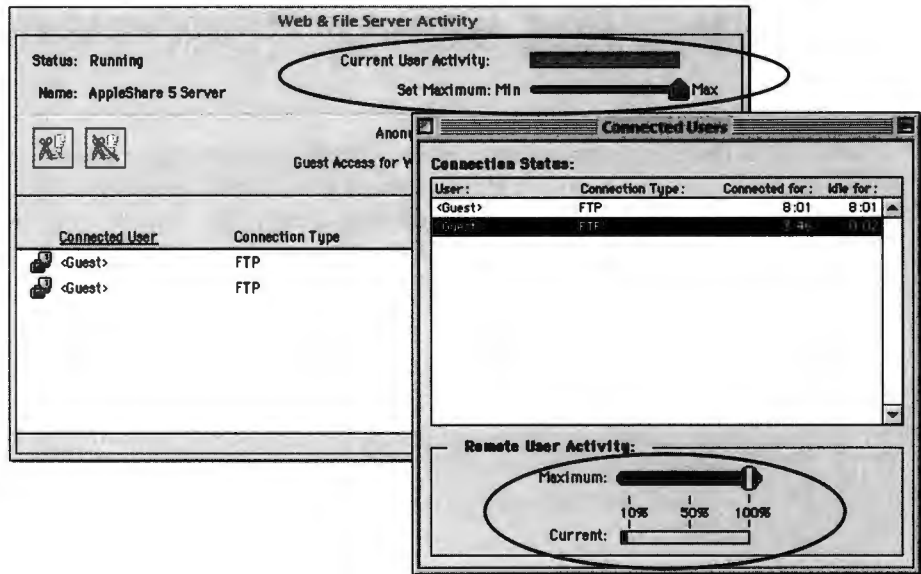


FIGURE 4-111: Adjusting AppleShare's processor usage level.

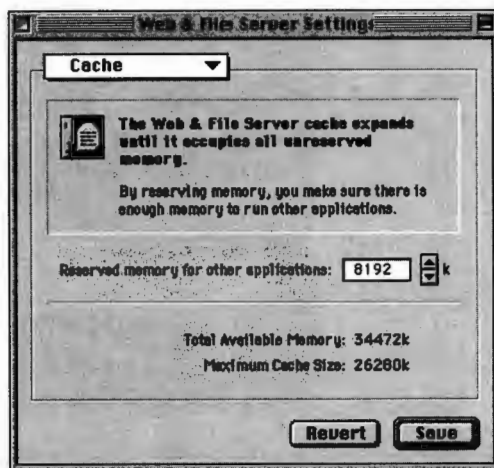
By moving the lever to the right, you increase the processing time the computer gives Web & File Server, thereby increasing its performance. By moving the lever to the left, you reduce the time, thereby decreasing Web & File Server performance.

If you are running other services in addition to Web & File Server on one computer, you should not generally "floor it." By hogging the processor for Web & File Server, you reduce the processing power available for other applications and, in some cases, lower their performance. Experiment until you find the best compromise.

## Optimizing Cache Use

The Web & File Server stores frequently used files, folders, and icons in a specially designated portion of RAM called the *cache*.

As I explained earlier, AppleShare IP will grab all available RAM except 1 Mbyte for this cache by default. If you run more applications on the server computer besides AppleShare IP, you will need to reduce the size of the cache accordingly via Web & File Server Admin.



---

FIGURE 4-112: Adjusting the RAM cache.

Naturally, the more RAM you can allocate, the better your server will perform.

You can make changes to the RAM cache on the fly to boot up occasional applications. Simply adjust its preferences as we did earlier and then choose the **Reset Cache** command from Web & File Server Admin's **Server** menu bar item. Depending on the server computer, resizing can take a few minutes.

## Right-Sizing Client Connections

The previous two settings make more computer resources available to AppleShare IP, but that is only half the equation. You can also optimize the number of concurrent connections permitted by your server so that

there is less overall demand on its resources. This too is done through Web & File Server Admin's Settings dialog box.

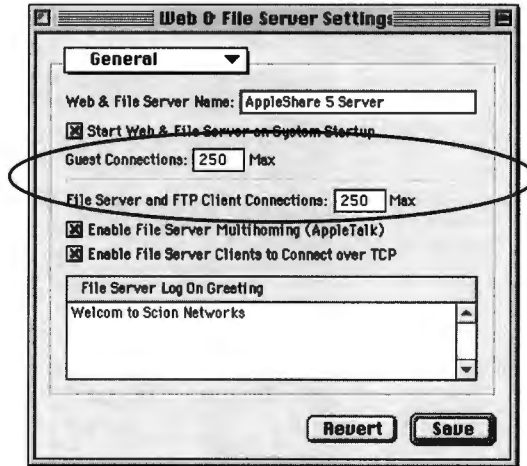


FIGURE 4-113: Reducing the number of concurrent connections.

By default, AppleShare IP allows the maximum number of concurrent connections that are permitted by your serial number. Do you really need that many? Lowering the number of users allowed to connect to the Web & File Server at the same time can improve its performance. You can limit the number of guest users who can log on at the same time separately. How generous do you want to be with your server's resources?

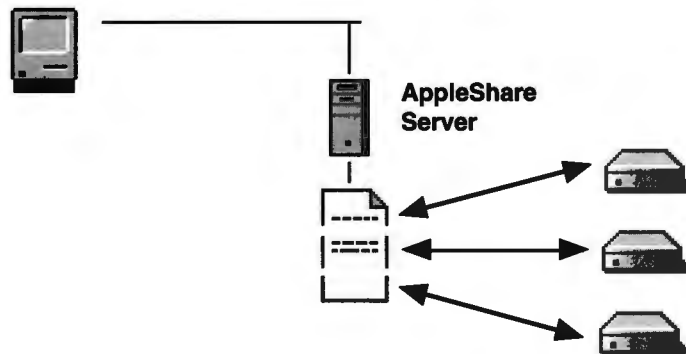
These limits affect the number of users who can connect through both the AppleShare client and FTP. They do not affect the number of concurrent Web browser connections, but, as you will see in the next chapter, that is a very different matter.

## It's RAID!

Apple literature defines RAID as a *Redundant Array of Independent Disks*. That is a bit of a misnomer since what Apple RAID software really does is make multiple server drives *interdependent*.

RAID levels are defined by international standards that refer to the performance characteristics they offer. The standards supported by Apple RAID are:

- **Level 0:** faster data access, accomplished through *striping*, a technique that spreads the data for a given file across multiple disks, thus multiplying the speed at which it can be stored and retrieved.

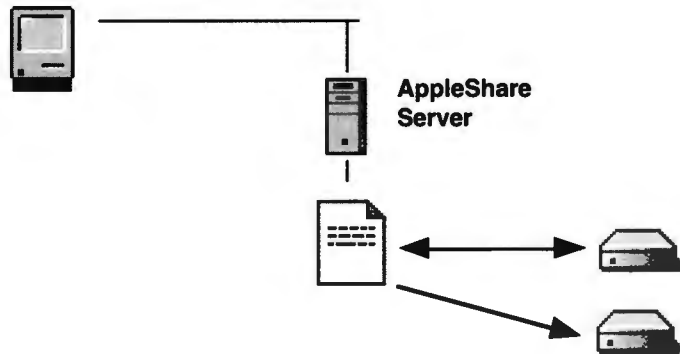


---

FIGURE 4-114: Apple RAID striping.

- **Level 1:** data redundancy, accomplished through *mirroring*, a technique that writes duplicate data to more than one disk, generally using two separate disk controllers. On a mirrored system, file services can be continued without interruption should the primary hard drive fail. In this event, the secondary drive takes over for the primary automatically.





---

FIGURE 4-115: Apple RAID mirroring.

Apple RAID software, available as part of the Apple Workgroup Server bundle, is composed of two parts. The first is the main application, used to format and set up RAID drives; the second is the RAID monitor extension, which makes sure the RAID disks are synchronized.



---

FIGURE 4-116: Apple RAID application and the Apple RAID monitor extension.

Here is how it is used.

## Striping for Speed

The hard disks on your server must be re-initialized to use Apple RAID. In addition to the standard HFS volume format, Apple RAID makes two more available: mirrored volume and striped volume. Striping is the format that increases server performance.

Under RAID, a “volume” can comprise one or more disks—think of it as a virtual hard disk. One nice thing about this is that you are not limited by the physical constraints of your hardware. For example, your server may have four hard disks but, for convenience, you would rather give users just one volume to mount on the desktop. The four disks can be striped to present one volume. Going in the other direction, RAID volumes can be divided into partitions just like standard hard disks. If you wish your users to see the server as composed of multiple, separate volumes, then you need only create multiple partitions.

A server’s disk read/write times can be reduced by more than half with RAID Level 0. You will see the best performance if you use disks of the same make, model, and size that are configured identically and—if your server supports it—that run off separate SCSI buses with Fast/Wide-SCSI cards.

Before I show you how to set up Apple RAID there are some rules you must know:

- You will need between two and four hard disks of no less than 200 Mbytes and no more than 2 Gbytes each in size.
- There can be no more than 10 Apple RAID volumes per server.
- There can be no more than eight partitions per volume.
- Before you employ Apple RAID, you will first need to perform a complete milestone backup such as we did in Chapter 3. *The data on all subject drives will be deleted during the following procedure!*

## Mirroring for Safety

Although the point of this chapter is performance tuning, I would be remiss if I did not also talk about protecting server data through mirroring.

Mirroring has two main advantages. First, information on the mirrored volume is as old as the last disk write, not the last backup, which protects more data more often. Second, mirrored drives can take over for failed primary drives, making your server more fault tolerant.

Mirroring has two main disadvantages. First, duplicating the number of hard disks on your server can be expensive. Second, RAID Level 1 increases read/write times somewhat (by about the same amount of time that RAID Level 0 increases it, in fact).

Whether the advantages outweigh the disadvantages will depend on how crucial it is that all of your server's data be preserved, and be available, all the time.

## Setting up Apple RAID

In the following section I will show you one way to set up a RAID system. No system can be set up without adequate planning. First, however, let's look at getting the hardware up and running.

***Install the hard disks.*** Add new hard disks as necessary. When all the hardware is in place, boot the server to verify that the installation was done properly. At this point, you do not need to worry about formatting the new disks.

When you know that the hardware is functioning properly, you may reboot the server from the CD-ROM that contains Apple RAID. (Hold down the C key when booting to make the CD-ROM the Startup Disk.)

In this example, we will use two 1-Gbyte disks, both on a single SCSI bus.

***Initialize the hard disks.*** Both hard drives must be initialized to become RAID-compatible. This will erase all data on those disks, so do not perform this step without a backup. To initialize the drives, select them in the Disks pane of Apple RAID's Setup window; then choose the **Initialize** command under the **Disk** menu bar item.

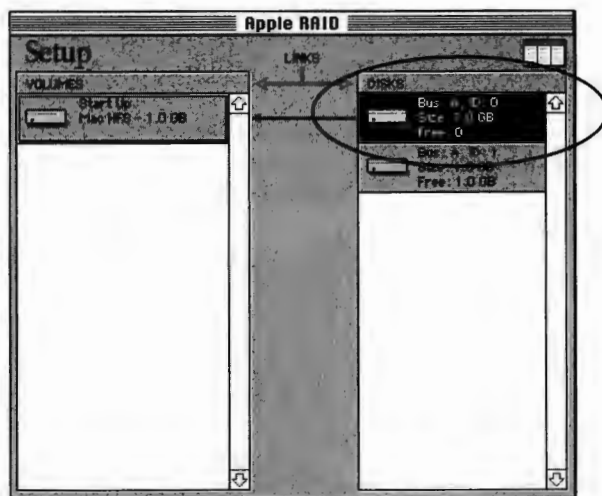


FIGURE 4-117: Initializing RAID drives.

The process can take several minutes. When it is complete, you will see the newly initialized disks represented by Apple RAID icons.

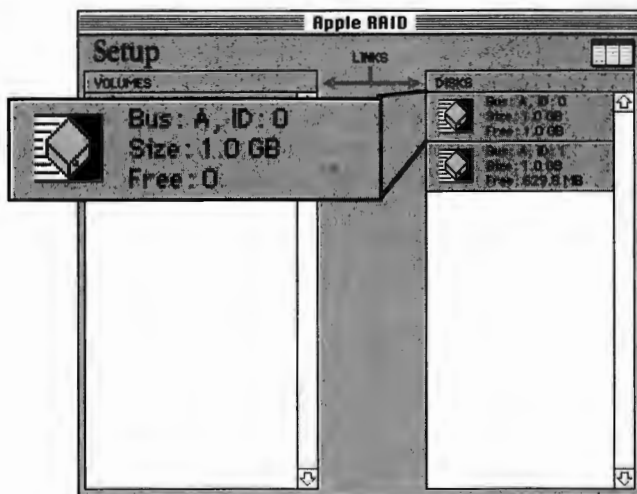
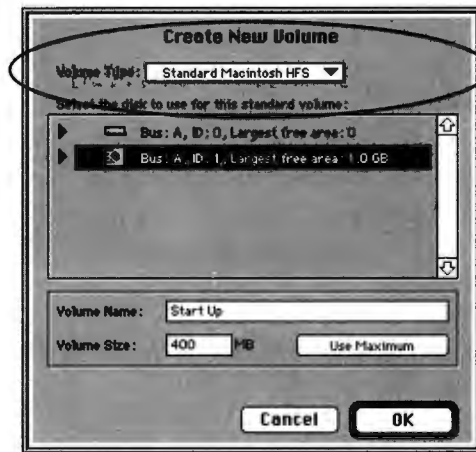


FIGURE 4-118: Icons of RAID-formatted disks.

**Establish Startup Disk.** At the moment, both of these disks are empty. To reboot the server you will need to create a volume that contains a System Folder—the Startup Disk.

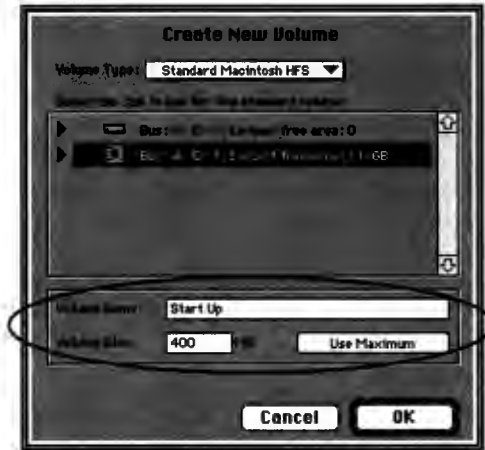
Choose the **New** command from the **Volume** menu bar item. This will open the Create New Volume dialog box, where you choose the **Standard Mac HFS** option in the Volume Type pop-up menu.



---

FIGURE 4-119: Creating a Startup Disk.

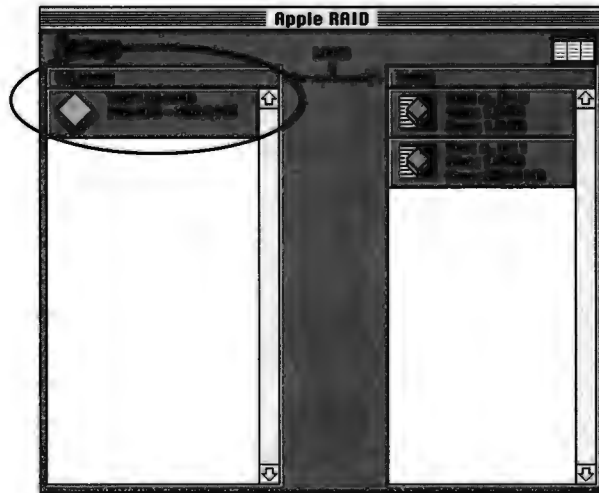
Next, name the volume in the Volume Name field (e.g., “StartUp”). Now you will need to establish a space that is large enough to store all of the data you plan to install on the Startup Disk (System Folder, AppleShare IP, etc.) in the Volume Size field. This could be the whole amount of available free space on the primary disk or just a portion of it. Enter this number in the Volume Size field (e.g., 400 Mbytes) and then press **OK**.



---

FIGURE 4-120: Setting aside a portion for the Startup Disk.

When you have done this, the new volume will appear in the Volumes pane of the Setup window designated with the RAID icon. Note that the size of the Startup Disk (in Mbytes) has been subtracted from one of the drives in the Disks window.



---

FIGURE 4-121: Viewing a RAID-formatted Startup Disk.

With the RAID established, you may install a System Folder on the Startup Disk. After that, install Apple RAID. From this point forward, you may run the server from the Startup Disk instead of the Apple RAID CD.

**Plan for RAID volumes.** When you have restarted the server from its Startup Disk, you will be ready to set up the RAID configuration, which requires a bit of planning. The worksheet in Figure 4-117 can be helpful in organizing your volumes. Apple includes a paper version with its Apple Workgroup Servers, and I have created an electronic version for you on the CD-ROM that ships with this book.

[illegible]

FIGURE 4-122: Apple RAID planning worksheet.

Using this worksheet you can break down the amount of disk space each volume will get and decide whether the volumes are to be striped or mirrored. For example, I am using two 1-Gbyte disks at SCSI addresses 0 and 1. I type "1,000" (Mbytes) in the top row of the SCSI bus chart. Next, I

plan to dedicate 400 Mbytes as a standard volume to host my system software. I name it "StartUp" in the Volume Names field and type in the size (in Mbytes) under the appropriate format column. I use another 350 Mbytes for a striped volume named "Need It Fast." I assign the remainder to a mirrored volume named "Very Important." The totals are carried down to the bottom of the worksheet.

**Apple RAID Worksheet**

SCSI Bus 1 (enter disk capacity in Mbytes)




Volume Names	Mirrored	Striped	Standard	0	1	2	3	4
				1000	1000			
StartUp			400					
Need It Fast		350						
Very Important	625							
<b>Subtotal</b>	625	x 2						
<b>Total</b>	1250	+	350	+	400	=	2000	

FIGURE 4-123: Entering data for RAID volumes.

Use the remaining fields to partition the RAID volumes, if you want. If your server has two SCSI buses, put two forms together.

**Create striped volumes.** To create a striped volume, select the New command from the Volume menu bar item and pick **Striped - RAID 0** from the Volume Type pop-up menu. You will need between two and four RAID-initialized drives to host a striped volume.



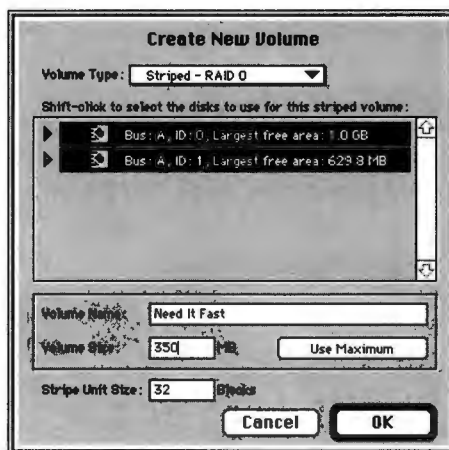


FIGURE 4-124: Creating a striped volume.

A striped volume can be as small as 10 Mbytes and as large as 2 Gbytes. Name the volume in the Volume Name field, and enter the amount of space it will consume in the Volume Size field. You will also be asked to choose a stripe unit size. The default for this field is 32 blocks. Increasing or decreasing this might improve performance, but the default works best in most cases. Press the **OK** button when you have finished.

To view partitions as well as volumes and disks, press the Expand icon in the upper right of the Setup window.

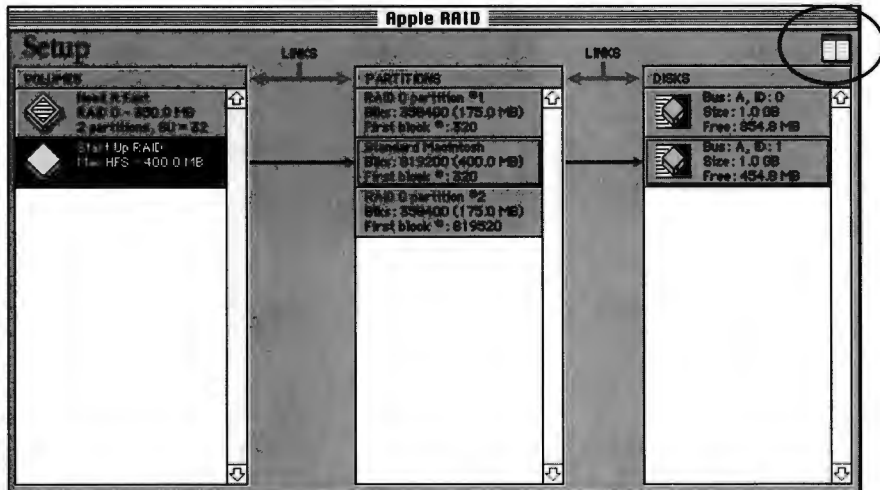


FIGURE 4-125: Expanding the Setup window to see volumes, partitions, and disks.

**Create mirrored volumes.** Since a mirrored volume is a reflection of a primary disk, you will need to select a secondary disk that has enough free space to hold the copy.

Again, choose the **New** command from the **Volume** menu bar item. In the Create New Volume window, select the faster of two drives as your primary disk (because that is the one from which the server will be reading). Next, hold the **Shift** key down to include a secondary disk. Choose **Mirrored - RAID 1** in the Volume Type pop-up menu, give the volume a name, designate a size, and then press the OK button.

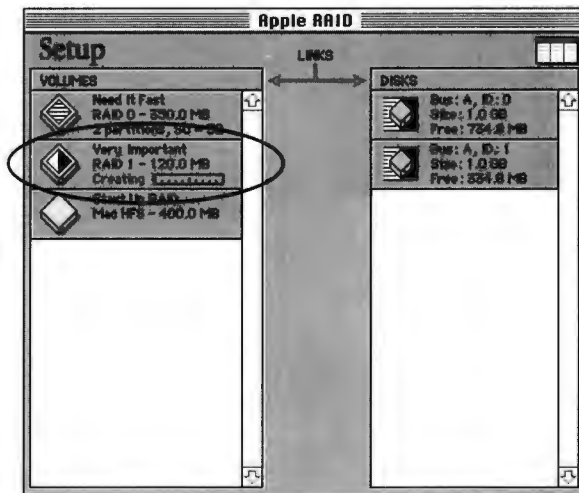


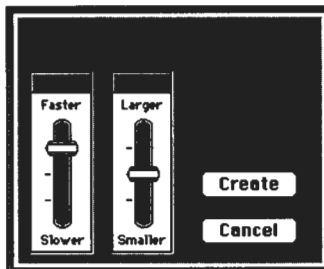
FIGURE 4-126: Creating a mirrored volume.

Besides creating a mirrored volume from scratch, you can also mirror a standard volume. Select the standard volume in the Volumes pane of the Setup window; then choose the **Create Mirrored Volume** command from the **Volume** menu bar item. In the Select Mirror Disk dialog box that appears, select a secondary disk of sufficient size to hold the mirrored volume.



FIGURE 4-127: Selecting a secondary drive.

Pressing the **OK** button takes you to the Mirror Create Parameters dialog box. If other processes are running on the server while you are doing this, you can decrease the I/O Rate and I/O Size settings here in order to prevent slowing users' work to a crawl.



It is a good idea to mirror the Startup Disk. Should the primary disk ever fail, your System Folder, with all of its vital preference settings, will still be available on the secondary disk.

## Rebuilding RAID Disks

RAID will usually operate without your intervention. Sometimes, however, you will notice a RAID notification icon flashing at you from the server. Launch Apple RAID to correct the problem.

An **Out of Sync** error is common when the server is shut down improperly. You see the affected volumes flashing in the Setup window. To correct them, choose the **Rebuild** command from the **Volume** menu bar item.

If you rebuild RAID volumes while AppleShare is running, lower AppleShare's Set Maximum remote user processing level1 to 50 percent or less. Rebuilding is a CPU-intensive operation.

## Restoring RAID Disks

If your server goes down and you need to restore all of its data from a Retrospect backup, your volumes will not be rebuilt in the same striped

and mirrored format in which you created them. The volumes and their data will be restored, but not the RAID configuration. For this reason, it is wise to take screen capture of the Apple RAID Setup window each time you change the configuration by pressing the **Shift-Command-4** key combination. Print this out and keep it in a safe place.

## SUMMARY

AppleShare IP file server uses AppleTalk, FTP, and AFP/TCP to share the folders and the files they contain (share points) with registered users who have privileges to read data, write data, or both, in one of three categories: owner, user/group, and everyone.

Guest access and anonymous FTP permit unknown users access to the server and should therefore be used carefully.

Web & File Server Admin defines share points and their associated access privileges, creates and manages user and group accounts, and enables/disables server operations and various preferences.

Santorini's Server Tools may be used to enhance server administration by providing extensive accounting, performance management, and fault management functions.

Dantz' Retrospect may be used to back up the data of both server and remote workstation hard drives to a variety of media over AppleTalk or TCP/IP. It can be scripted to run automatically, and it should be scheduled to run at least daily.

There are several ways in which file server performance can be improved, including processor and cache optimization and the limitation of concurrent user logons. In some cases, Apple RAID can be employed to provide hard disk mirroring and striping.



# AppleShare IP Web Server

In addition to the file server capabilities AppleShare IP provides, the Web & File Server application gives you the ability to host a public Web site or a private Intranet.

A Web server's simple function is to dole out to clients, or browsers, that request them ASCII text documents that are interspersed with HyperText Markup Language (HTML) tags. The Web browser interprets the HTML tags as code directing it to display the document's text, and any images that are linked to the document, in a certain way.

The real power of a Web server comes from its use of Common Gateway Interface (CGI) applications, which process information

and pass the results, in HTML, to Web browsers. AppleShare IP supports the use of such CGIs.

As is the case with AppleShare, Web servers adhere to the traditional client/server paradigm, with some important variations. In this chapter I will explain how Web transactions take place over the HyperText Transfer Protocol (HTTP) and how CGI interactions work. I will show you how to enable AppleShare IP Web Services, create Web pages, and work with CGIs and Multipurpose Internet Mail Extensions (MIME). Finally, I will show you both basic and advanced procedures for administering Web services.

## HOW THE WEB WORKS

The popularity of the World Wide Web, also referred to as WWW, W3, or just the Web, has taken most computing professionals by surprise. When my career in computers started, anyone who referred to a GUI on the Internet meant Gopher. This system, created at the University of Minnesota and named after its mascot, uses a primitive hierarchical display of windows and folders.

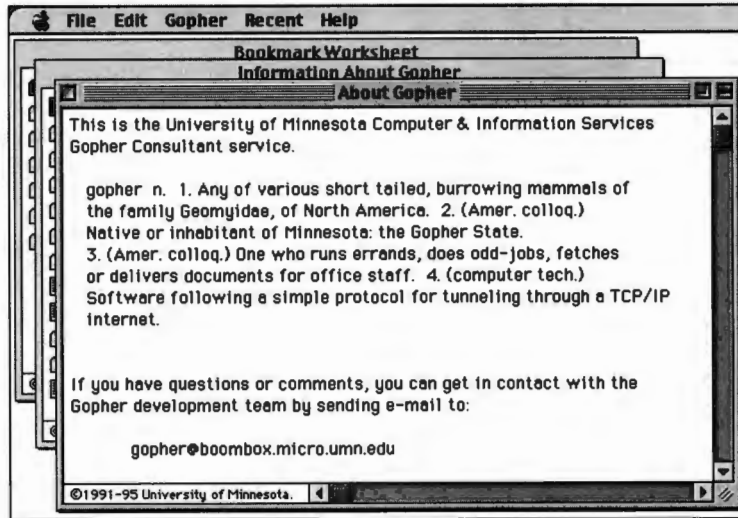


FIGURE 5-1: The University of Minnesota's Gopher.

The vision of a worldwide library, as the Web has become, is not a new one, however. As early as 1945, Vannevar Bush wrote in the *Atlantic Monthly* that the next endeavor of scientists—having ended World War II by ushering in the nuclear age—should be to create an easily accessible repository of all human knowledge. The people who could really do something with the knowledge, he noted, were not always able to find it.

The means for achieving such a goal were suggested in 1981 when Ted Nelson wrote *Literary Machines*, in which he described a system that permitted readers to create links via HyperText. He called the system Xanadu.

The Web as we know it today was not created by such lofty visionaries but by men with a specific and practical need. Tim Berners-Lee wanted to speed up the time it took to locate information in the huge volume of databases, reports, notes, and technical papers maintained by the European Particle Physics Institute (CERN) in Geneva, Switzerland. He had hacked together a HyperText tool in the early 1980s and thought this might be just the place to apply it. He proposed this in 1989.



Berners-Lee's HyperText project turned into the Web in 1990 when he and a colleague, Robert Cailliau, co-authored a document that introduced the idea of a networked "web" of computer nodes through which one could browse by using HyperText links. In 1991, CERN's World Wide Web went into action. A year later, CERN released a library of Web development tools, and the first Web browser was made available via FTP.

The Web was still unknown to most people until 1993, when Marc Andreessen and Eric Bina of the National Center for Supercomputing Applications (NCSA) created Mosaic. I assume you are familiar with the rest of the story. Mosaic became hugely popular, and Andreessen co-founded Netscape Communications Corp., which became the early standard-bearer for Web applications. Then software giant Microsoft entered the market. Today, the Internet is a mass medium.

In addition to Mac OS versions of Mosaic, the Mac OS world got a Web server with the introduction of Chuck Shotten's shareware application MacHTTP, later to be superseded by Quarterdeck/StarNine's WebSTAR. Not until 1997, however, did Apple join Microsoft and Novell in adding Web services to its file server offering.

The initial AppleShare IP release does its job using the HTTP 1.0 standard. Here is how it works.

## HTTP in Action

Like AFP and FTP, HTTP requires a reliable connection between the client and server over which it can transfer its HyperText files. Also like AFP and FTP, it uses TCP to make this connection. Beyond that, it operates somewhat differently.

Once a workstation is properly configured and attached to the Internet, it can communicate with any HTTP server in the world like so:

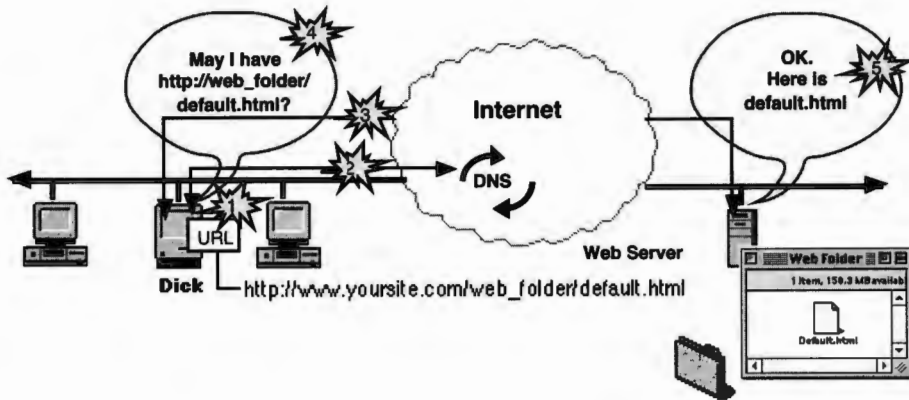


FIGURE 5-2: Client-server communication using HTTP.

1. Dick directs his Web browser using a Universal Resource Locator (URL). A URL is composed of a protocol associated with a hostname in a command format:

Domain Name  
 http://www.yoursite.com/  
 Protocol      Hostname

The URL may or may not include a directory path and file name:

http://www.yoursite.com/web\_folder /default.html  
 Protocol      Hostname      Pathname

Technically, a URL is a form of Universal Resource Identifier (URI)—a formatted text string that identifies a Web resource by name, location, or some other characteristic.

2. The browser opens a TCP connection and calls on DNS to identify the IP address of the machine associated with the hostname. (This type of transaction is the subject of Chapter 11.)
3. The workstation and Web server establish a TCP connection.
4. The first HTTP command (appropriately named **GET**) is sent from the browser to the server. This command is a *request*, which contains some identification for the request method, URL, protocol version, request modifiers, client information, and perhaps some body content. In other words, the browser asks for a Web page.
5. The server now sends a *response* consisting of a status line that includes the protocol version, a code designating success or failure, a message containing server information, body content, and perhaps more data. In other words, the browser hands back the requested Web page or an error message explaining why it could not do so, such as "error 404: Not Found."
6. Once it has received the response, the browser tears down the TCP connection and displays the body content to Dick.

There is a difference between this and the other file exchange methods I have shown you so far. Traditionally, the TCP connection is maintained only for as long as it takes for the request/response transaction to complete. After that, the browser has nothing more to say to the Web server, and the Web server forgets all about the browser. When another URL is needed, the process begins again.

This methodology makes Web services easy on a server's processor, especially where the HTML pages are small. Consider this, however: Every HyperText link to a referenced document requires a separate connection. If you have a home page that is linked to two images, that home page will require three separate connections to be properly displayed in a browser.

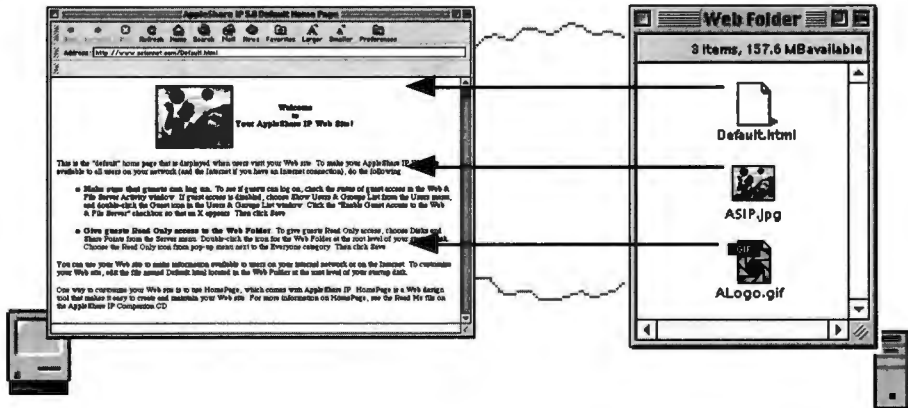


FIGURE 5-3: One page, but three hits.

Remember *that* the next time some novice Webmaster tells you how many connections, or hits, are generated by his Web site. If you hear something like “200 people browse our home page every hour,” ask, “You mean you got 200 hits?” If the home page has 10 images on it, then 20 people visit that home page per hour. 200 divided by 10 equals 20.

Multiple connections create multiple delays, which did not make sense to a lot of people, including Apple engineers. First, the browser has to resolve the hostname with DNS each time. Second, the browser and server have to set up a new TCP connection. Then there is a slowdown while the TCP/IP protocol adjusts its transmission speed to the available bandwidth. Finally, the browser must tear down the TCP connection after the file is transferred.

To avoid this, Apple engineers adopted the concept of “persistent connections” or “keep-alive,” in which a browser and a Web server open a connection and keep it open, using the same TCP connection to support multiple requests and responses. Browsers capable of reading the new HTTP headers that make this possible can even “pipeline,” sending a new request without waiting for the response to a previous one.

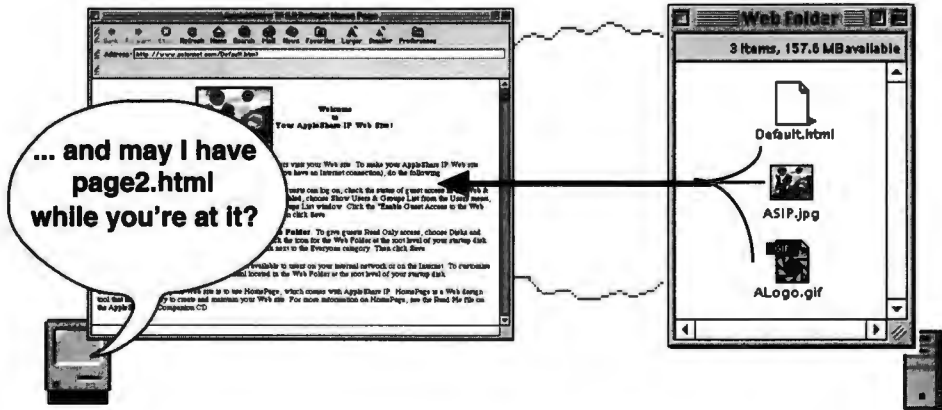


FIGURE 5-4: A connection using “keep-alive.”

As with AFP, the connection is not left open indefinitely. If there is no request from the browser in 60 seconds, it “times out” and is terminated.

Although HTTP is thought of as the primary protocol of the Web, modern browsers seamlessly support others as well, such as FTP, Gopher, and Telnet.

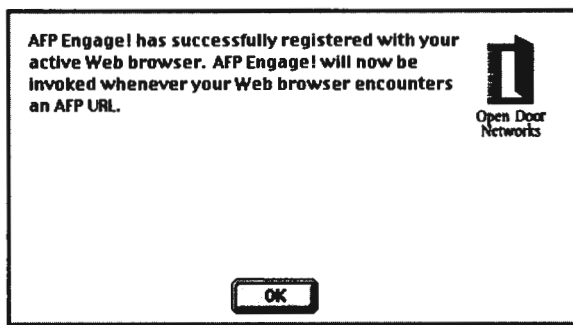
## How About AFP://?

If Web browsers can access files using HTTP/TCP and FTP/TCP, then why not using AFP/TCP? They can, if they have been programmed to recognize AFP. As of this writing, most are not.



There is a solution to this situation, however. Open Door Networks' AFP Engage! works in concert with Internet applications such as Web browsers and email clients to process URLs that refer to AFP.

To install AFP Engage!, launch both it and your Web browser and then select the **Register** command from the AFP Engage! **File** menu bar item.



---

FIGURE 5-5: Successful AFP Engage! installation.

Now, when you type a URL in the form

`afp://www.yoursite.com/Pub`

AFP Engage! will mount the remote server's volume on your Mac OS computer's desktop.

## Directory Listing

Recall that with both AppleShare and FTP, a successful client logon generally ends in the user viewing the contents of a folder or directory. The Web server, on the other hand, returns a home page. On most Web servers, HyperText links are arranged in such a way that users move from page to page without paying attention to the directory structure that contains them. It does not have to be that way, however. By using AppleShare IP's automatic directory listing feature, users can specify a folder in

a URL, and so long as they have proper access privileges they will be shown a HyperText directory listing of that folder's contents.

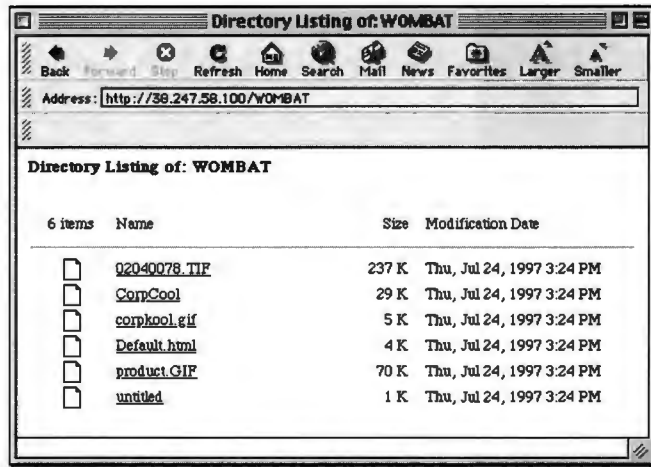


FIGURE 5-6: Viewing a folder's contents via a directory listing.

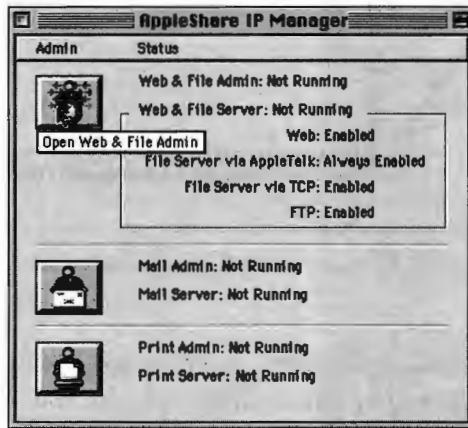
This will work unless you put a file named "index.html" in the folder. In that event, the Web server responds with that file instead of the directory listing.

## ESTABLISHING WEB SERVICES

If you followed the instructions in the previous chapter, you might already have AppleShare IP's Web services up and running. If not, let me take you through an abbreviated version of the procedure.

## Launch Web & File Server Admin

To use the Web server for the first time, launch the Web & File Server Admin application by double-clicking on it directly or, if you have AppleShare IP Manager running, by pressing the first button in the window. (You can also choose the **Open Web & File Admin** command under AppleShare IP Manager's **File** menu bar item.)



---

FIGURE 5-7: Launching Web & File Server Admin from AppleShare IP Manager.

This will open a password dialog box in which you must enter the **Administrator Name** and **Password**. Then press the **OK** button. The Web & File Server Activity window will appear.



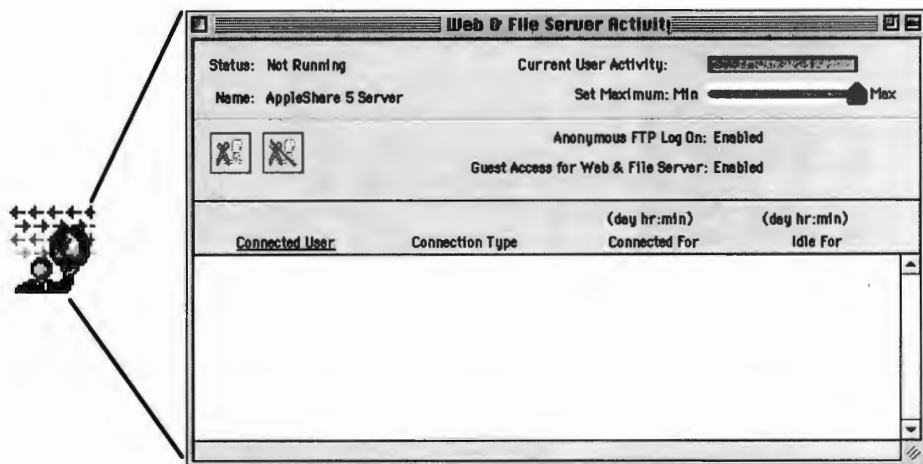
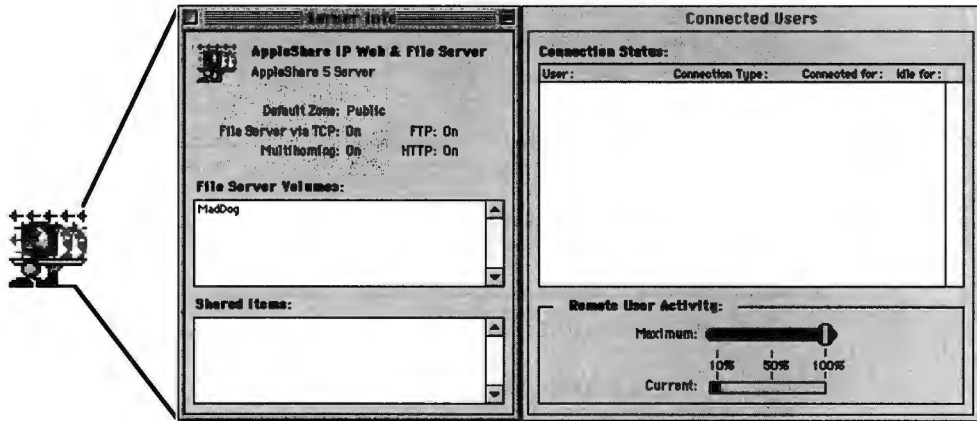


FIGURE 5-8: AppleShare IP Web & File Server Admin and its Web & File Server Activity window.

This window tells you who is connected to your file server and how active they are. It does not tell you about browsers connecting over HTTP, however.

## Launch Web & File Server

If the Web & File Server application is not already running, you can launch it manually by choosing the **Start Web & File Server** command under Web & File Admin's **Server** menu bar item (or by pressing the **Command (⌘)-[** key combination).



---

FIGURE 5-9: AppleShare IP Web & File Server and its Server Info and Connected Users windows.

Web & File Server uses AppleShare's traditional interface, with some additions. For example, the HTTP status line will tell you if Web services are **on** or **off**.

## Create Share Points

You need to share the "Web Folder" that AppleShare IP created on the server's hard drive (or one that you create on your own). Doing so will give Web browsers access to the Web server's HTML pages.

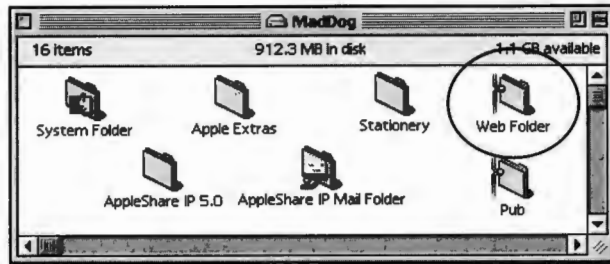


FIGURE 5-10: Sharing the automatically created Web Folder.

To do this, bring Web & File Admin forward in the Finder and select the **Show Disks & Share Points** command under the **Server** menu bar item (or use the **Command (⌘)-L** key combination). Here, click on the arrow next to the name of the server's hard drive to see a cascading list of its contents; then choose Web Folder in the list.

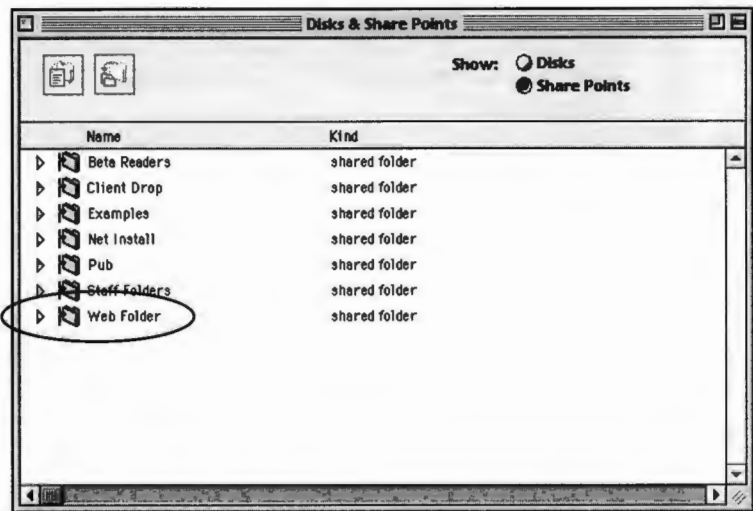
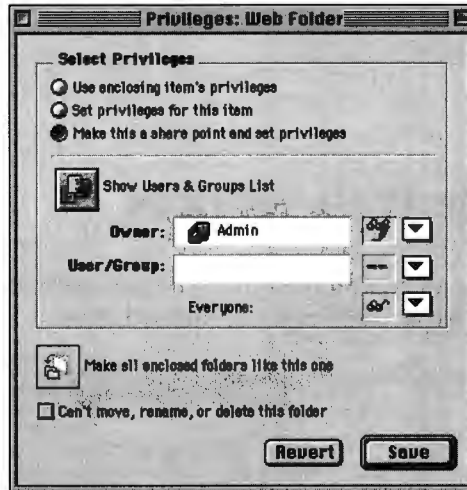


FIGURE 5-11: The Web Folder as a share point.

Choose the **Privileges** button here to open the Web Folder's Privileges dialog box (or just double-click on it).



---

FIGURE 5-12: Setting Web Folder privileges.

In the Privileges window, choose the **Make this a share point and set privileges** button in the Select Privileges field. The Administrator's account name is listed in the **Owner** field by default. Change the access privileges for **Everyone** to **Read Only** (eyeglasses) in the field's pop-up menu. Press the **Save** button and then close the Privileges window.

If you want to allow guest access to your server via FTP but not HTTP, perhaps because the server is part of a private Intranet, leave **Everyone** Privileges as **None**. Next, create a group and add all of your registered users to it. Assign the group privileges in the user/group category. If you are the only one making changes to the Web Folder's contents, give the group **Read Only** access. If others in the group also make changes, give the group **Read/Write** privileges.



*Note: If you have created your own folder, it might not be named "Web Folder." Whatever it is named, I will refer to the folder that is home to your HTML pages as the "designated Web Folder" from here on.*

## Enable Web Services

Next, choose **Web** in the pop-up menu of the Web & File Server Admin's Web & File Server Settings window.

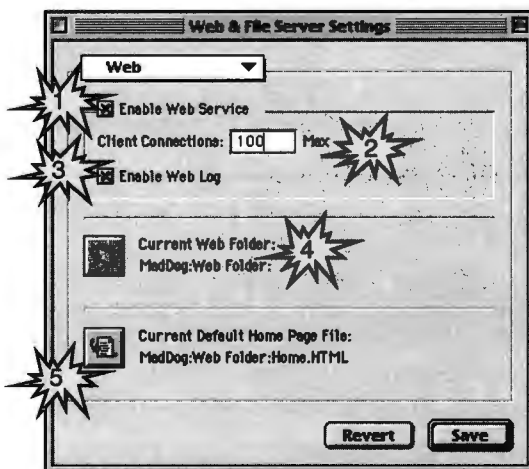


FIGURE 5-13: Enabling Web settings.

This window is your primary point of interaction with the Web server. Its features follow.



AppleShare IP's HTTP server is activated with the **Enable Web Service** checkbox.



As with the file server, the number of people who can connect to your Web server at the same time is limited by your serial numbers. If your AppleShare IP serial number supports more than 50 concurrent users, you can achieve the maximum number of HTTP connections, 100.

You may increase server performance by reducing the number of connections in the Client Connections field.



If you activate the **Enable Web Log** checkbox, information about each hit handled by your Web server will be stored in a log file. I recommend this, but you should know that enabling this feature might decrease the performance of your AppleShare IP servers by as much as 10 percent.



Web activity is restricted to just one folder on the server, which can be designated using this button. AppleShare IP creates a “Web Folder” at startup, but you can use another if you prefer.

The Mac OS makes a Web server secure. Its HFS makes it bulletproof in the face of attacks that regularly compromise other platforms. Even if you made a mistake and opened up this folder to guest access with read/write privileges, the worst damage someone could do would be to ruin your Web pages. They would not get beyond that folder.



All Web sites have one point of entry, called the home page. You can choose an HTML document to be your home page with this button. When users request a URL without a specific path to visit your site, this is the first page AppleShare IP will give them.

A home page is traditionally named “index.html” or, in some cases, “default.html.” Under AppleShare IP, you may call it whatever you like.

## View Apple’s Test Page

When AppleShare IP creates the Web Folder, it includes an HTML file and some linked images. If your Web server is running properly, you should be able to see this page by typing the appropriate URL into your favorite browser.

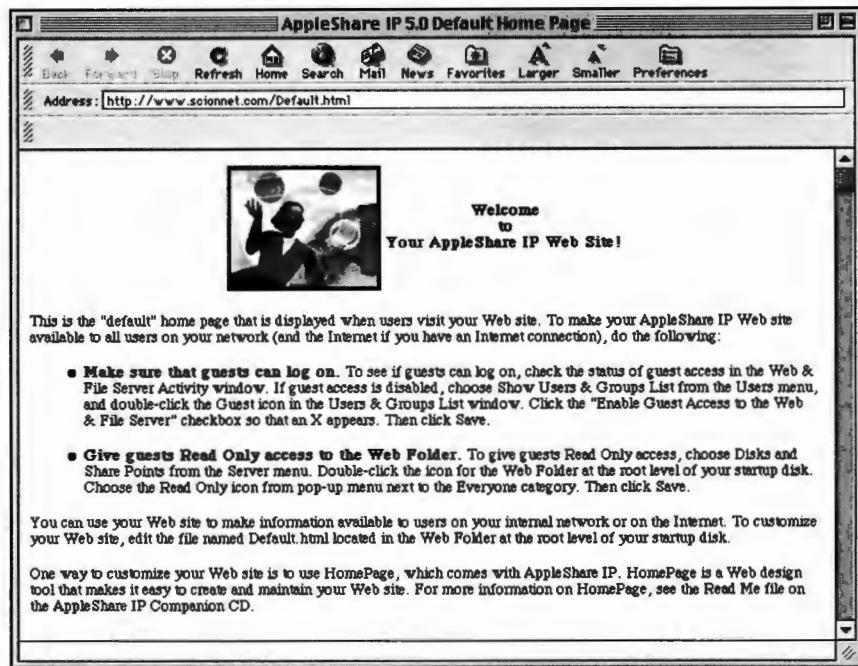


FIGURE 5-14: Apple's default HTML page.

## Create Your Home Page

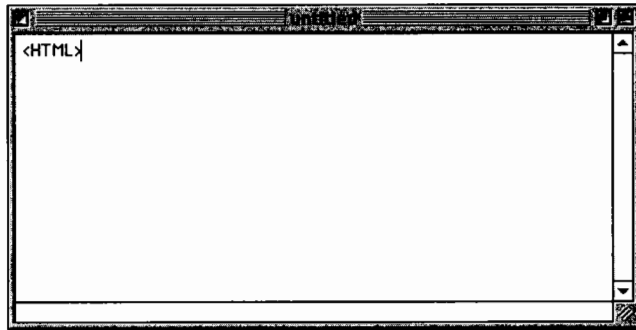
You know the Web server is working if you are able to see Apple's default HTML page, but who wants to look at *that*? Your organization now has its own Web server, so it should have its own home page! At least put one up to let visitors know that they came to right place but that the site is "under construction." Those of you who know HTML or who have a copy of Claris HomePage or some other HTML editor, can get to work. Those of you who do not can still put up a page without much effort. Let me show you how.

You do not need any special software to create a home page. All you need is a text editor such as Apple's SimpleText (which comes with the Mac

OS) and knowledge of a few codes that I will show you. If you have any art that can be included in the home page, such as a logo, convert it to a GIF (Thorsten Lemke's shareware utility GraphicConverter is great for this) and put it in the designated Web Folder. It is best to keep these art files at 45 Kbytes or less so that they will load quickly even over slow modem connections.

For the sake of this example, let's say that your organization is a beverage distributor. You might want your first page to say something about what your company makes.

Launch SimpleText and open a new document. The first step is to type in a code that will let a browser know that this is not just an ordinary text file but a Web page. Do this by typing the <HTML> tag like so:



---

FIGURE 5-15: Tagging your text file as HTML.

Next, give the document a meaningful title. For example, let's call our fictitious company Jones Beverages, Inc. The title of our home page could be "Jones Beverages Home Page," and we would type it up like this:



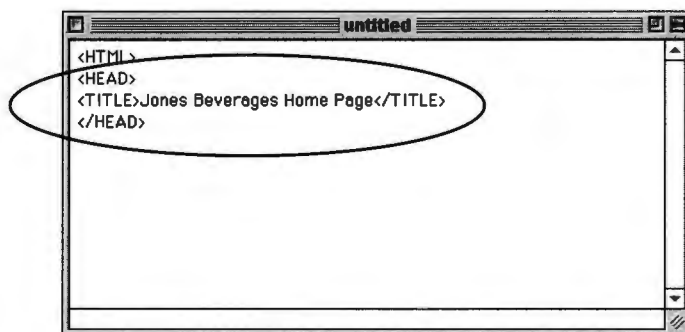


FIGURE 5-16: Adding the title.

Whatever is between the `<` and the `>` characters a Web browser will accept as computer code. The first tag turns a given attribute on; the second tag, preceded with a `/`, turns it off.

If you look at Figure 5-16, you can see that I have told browsers that here is the `<HEAD>` of a home page with a specific `<TITLE>`. The title is what appears in the window bar of the browser, not in the actual window:



To put something inside the window we must open with a `<BODY>` tag. Here we can add another title in a size that ranges from `<H1>` (biggest heading) to `<H6>` (smallest heading). What these sizes actually work out to in points is relative to the preferences of the browser. We can surround the heading with a formatting tag, `<CENTER>`, to put it in the middle of the page.

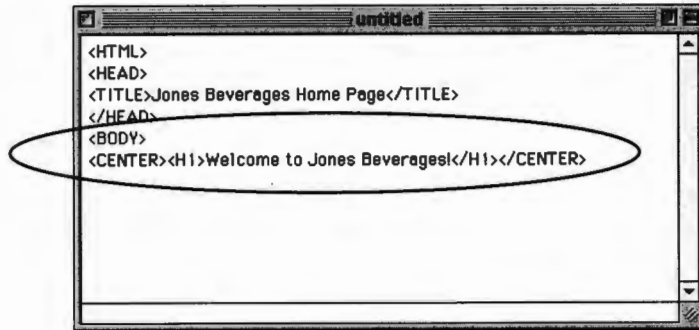


FIGURE 5-17: Adding a heading.

Under that we can add a slogan with no particular formatting. Note that unlike a normal word processor, HTML does not drop to the next line automatically when you reach the end of a page. You never know how wide the page is going to be when displayed in a browser, so a line break must be inserted whenever you want text to start on a new line. These tags come in two types. The `<BR>` (Break) tag puts you on the next line. The `<P>` (Paragraph) tag adds one line of space and then drops you to the next line.

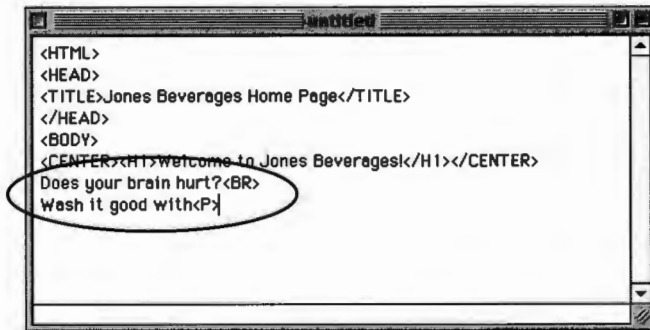


FIGURE 5-18: Adding text with line breaks.

You do not need a line break tag after a heading tag, however.

Now let's add a logo with an `<IMG SRC>` (image source) tag and the name of the image file, like so:

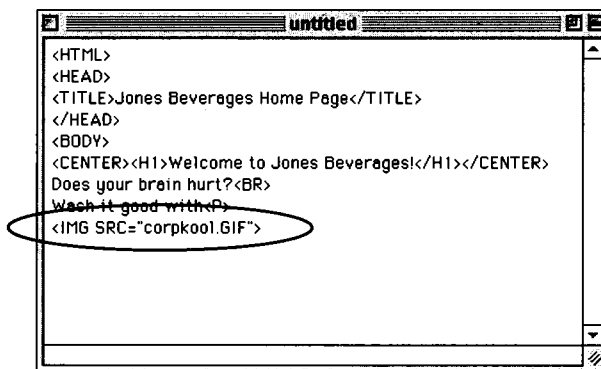


FIGURE 5-19: Adding an inline image.

Now, add a line at the bottom of the page using the `<HR>` (horizontal rule) tag. It is traditional for the Webmaster to sign the page, date it, and leave an email address. This is usually done with a small heading (e.g. `<H6>`).

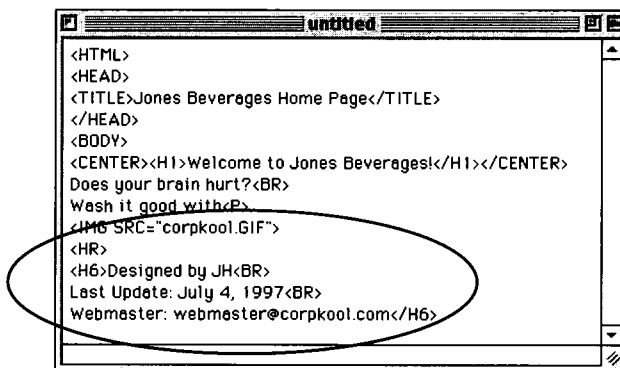


FIGURE 5-20: Signing the home page.

To close the document, close the `<HTML>` and `<BODY>` tags that were opened at the top.

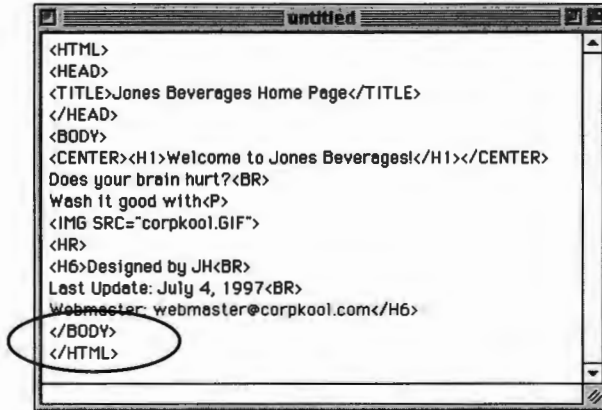


FIGURE 5-21: Closing the home page.

You now have a simple but perfectly useable home page. Save it under the name "Default.html" in the designated Web Folder and it will overwrite Apple's version. Then open it from a Web browser.

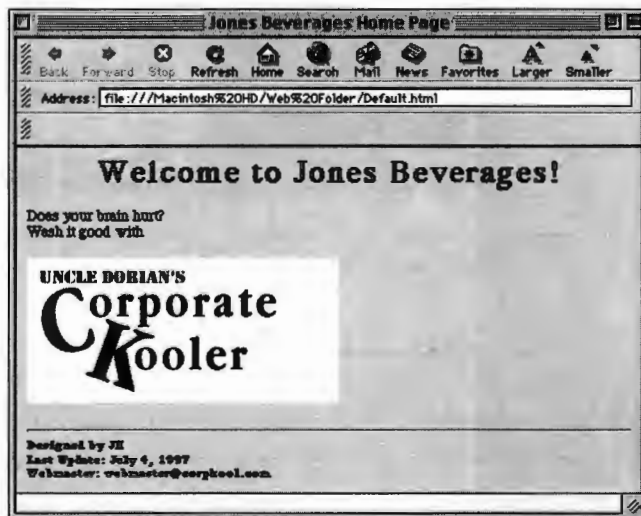


FIGURE 5-22: Example of a simple home page.

It is beyond the scope of this book to go into HTML further. If you have never done any HTML composition before and this interests you, take a look at some of the commercial editors available to make the task easier. My favorite is Claris Home Page.



FIGURE 5-23: Using Claris Home Page to create Web pages.



*Note: The best source of information on Home Page is Claris Home Page Companion by Maria Langer (AP PROFESSIONAL, 1997).*

## Using MIME

One of the nicest things about AppleShare IP's Web & File Server is that it supports Multipurpose Internet Mail Extensions (MIME). These enable Web servers and browsers to process the files transferred to them using the correct application. For example, if a file is compressed in Aladdin's Stuffit format (as designated by a ".sit" or ".sea" suffix in the name), MIME can tell your browser to expand it for you automatically.

The combination of suffix, file type, creator code, MIME type, and the actions they perform is called *MIME type mapping*. You can view these by choosing the **Web & FTP MIME Types** command from Web & File Server Admin's **Server** menu bar item.

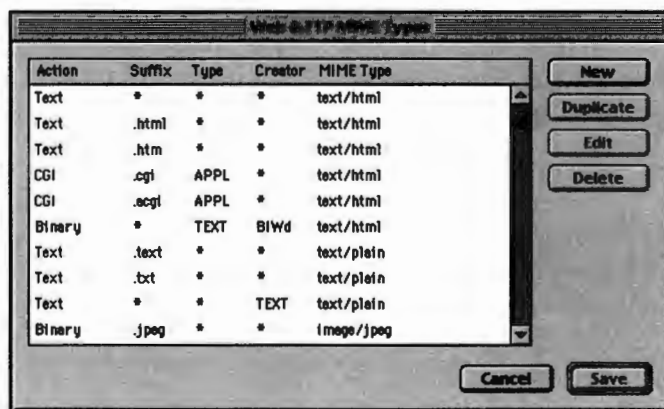


FIGURE 5-24: Viewing the Web server's default MIME type mappings.

MIME type mappings' parts work like this.

### Action

The Action field tells the Web server to perform one of several possible operations:

**Text.** Return the file that matches this mapping as a text file.

**Binary.** Return the file that matches this mapping as a binary file.

**CGI.** Execute the file that matches this mapping as a CGI script.

**Execute.** Launch a specific CGI script.

**MacBinary.** Encode the file that matches this mapping using MacBinary.

**BinHex.** Encode the file that matches this mapping using BinHex.

These last two are significant options. Ordinarily, the Web server returns only the data fork of a requested file to the browser. Without its companion resource fork, the file loses such niceties as icon, formatting data, and application association. That is fine when the file is requested by non-Mac OS machines, which do not understand the resource fork anyway, but it is limiting for people who have Macintoshes.

Thanks to these two MIMEs, when a requested URL ends with the extension “.bin” or “.hqx,” the Web server automatically encodes the contents of the file’s data and resource forks in either the MacBinary or BinHex formats and then sends the result to the browser—even when the file stored on the server and referenced in the URL does not have the extension. In other words, you do not have to encode the file before you put it up on the server. AppleShare IP can do the encoding on the fly.

At the client end, a utility such as Aladdin’s StuffIt Expander will decode the format. (More about that in Chapter 8.)

## Suffix

The Suffix field may or may not contain something. It will usually hold a three-letter designation that begins with a period (.), such as the “.bin” and “.hqx” mentioned above.

## File Type

The File Type field contains a four-place file type or an asterisk (\*) to indicate that any file type is a match.

## Creator

The Creator field has four places for the Mac OS creator code. An asterisk (\*) can also be used to mean that any creator code is acceptable.

## MIME Mapping

This field contains the MIME mapping's name, which is in two subfields separated by a forward slash (/), such as "application/x-macbinary."

Where asterisks are used in the preceding fields, a literal match will take precedence over the wild card match. If a given file can be matched with two or more MIME type mappings, the one with the most specific field matches is used. A tie between two or more of these mappings goes to the one that matches the file's suffix.

The AppleShare IP Web & File Server comes with more than 75 MIME type mappings. These ensure that the server knows about most of the Web's commonly used formats, such as Adobe Acrobat (.pdf), JPEG (.jpg), GIF (.gif), QuickTime (.qt), MPEG (.mpg), Microsoft video (.avi), MIDI (.midi), WAV (.wav), RTF (.rtf), and so on. Apple engineers even threw in a couple of workplace standards not supported by most IS departments: ID's Doom and Bungie's Marathon.

As new formats become available, you can add them to the list. For example, since AppleShare IP supports those well-known productivity enhancers Doom and Marathon, why not 3D Realms' Duke Nukem as well?

To add a MIME type mapping, you first need to know the file type and creator code for the application that creates the files the Web server will transfer. One way to find this is with Apple Computer's power-user tool ResEdit. For example, I can open the Duke Nukem application in ResEdit, then select the **Get Info** command from ResEdit's **File** menu bar item. The results are displayed in Figure 5-25.



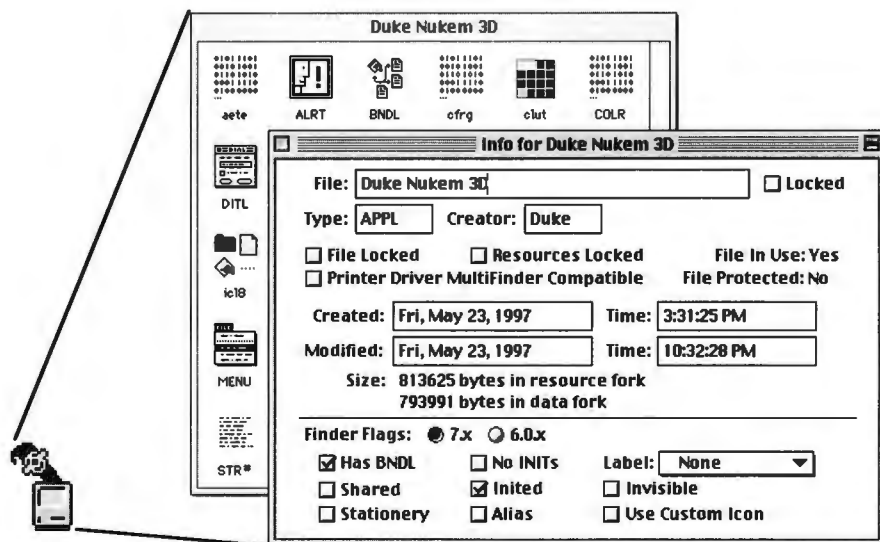


FIGURE 5-25: Locating the type and creator codes.

With the file type and creator code information in hand, I go to the Web & FTP MIME Types dialog box and press the **New** button. This opens the New MIME Type window. (I could save some effort by choosing the listing for a like program such as Marathon and pressing the **Duplicate** button.)

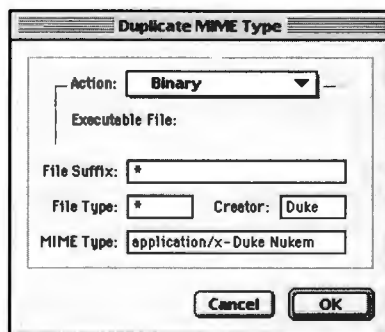


FIGURE 5-26: Adding a new MIME type mapping.

First, I need to choose **Text**, **Binary**, **CGI**, **BinHex**, **MacBinary**, or **Execute** in the Actions pop-up menu. Since Duke Nukem is an application, the choice is **Binary**. Next, I type in a suffix if I need to. I do not need to here, so the Web & File Server Admin program will automatically enter an asterisk (\*) to indicate a wild card. Any file suffix matches such a MIME type mapping.

The information for the next two fields is obtained using ResEdit. I leave the File Type field empty and let Web & File Server Admin enter a wild card, but I do enter a creator code.

Finally, I enter the name for the new mapping. It appears in the Web & FTP MIME Types window and will be available after I restart the Web & File Server.

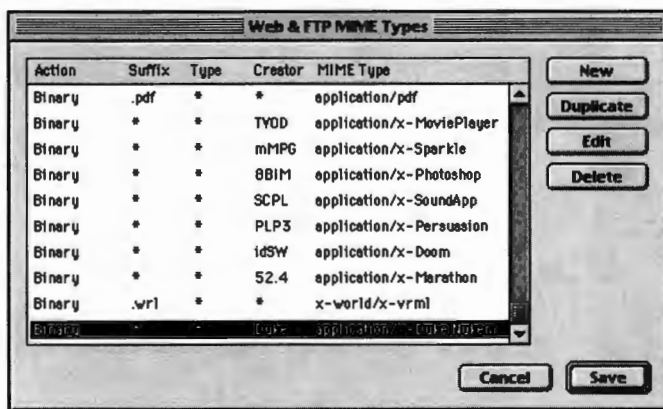


FIGURE 5-27: New listing in the Web & FTP MIME Types window.

Now anybody downloading a Duke Nukem network game file from my Web Server can launch right away. (Of course, why anyone would be so twisted as to play a sick game like Duke Nukem when they could be reading about Object Request Broker architectures or something, I'll never know.)

AppleShare IP's ability to know the file types it is transferring is a powerful feature. Still more powerful is its ability to look at a URL and then launch a CGI.

## Working with CGI

As I am fond of telling students in my Webmastering classes, Web servers are relatively stupid. What gives them their impressive power is the ability to call on other applications such as Java/JavaScript/Active X/whatever-is-next-enabled browsers and CGI. For example, consider the interaction between a browser, a Web server, a CGI, and Claris' File-Maker Pro database application.

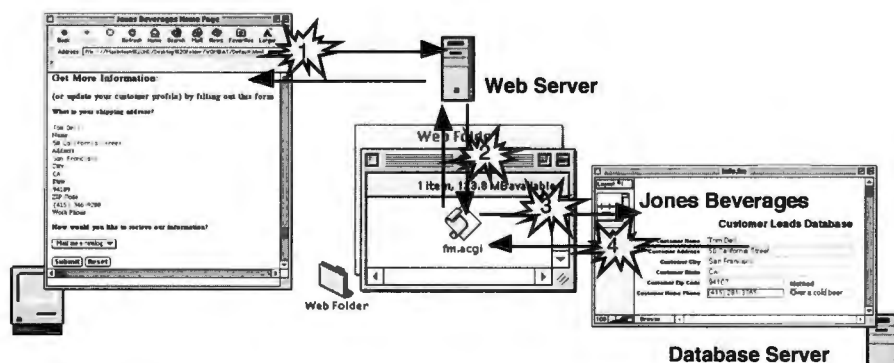


FIGURE 5-28: Interaction between browser, Web server, CGI, and database server.



A user fills out an HTML form in a Web browser. When he presses the **Submit** button, keywords in the form and a URL containing a modifier are sent to the Web server.



When the Web server receives the request, the modifier tells it to launch a specific CGI and pass the form's keywords on to it.



The CGI turns the request content into database queries and passes it on to the database application. It then waits for the results.



The database processes the query and passes the result back to the CGI.

At this point, the process switches into reverse. The CGI translates the data into a form the browser will understand (HTML) and passes it back

to the Web server. The Web server sends the query results back to the browser. The user sees the results in the browser window.

You might imagine that this takes a long time, but it usually takes just seconds. In fact, if the CGI does not respond to the Web server in 60 seconds, it will “time out” and give up on it.



---

*Note: You will see the acronyms CGI and ACGI both used in reference to these Web server helper applications. CGI has become the generic term, but in fact most of these applications are Asynchronous Common Gateway Interfaces, or ACGIs. ACGIs can handle multiple incoming and outgoing requests simultaneously, while CGIs are limited to one after another.*

---

From the simplest Web site to the most complex, the work that the Web server does is nearly constant. The interaction is all in the CGIs and the applications they communicate with.

You have almost certainly encountered a Web page that uses an image map—an image that contains HyperText-linked “hot spots.” That is one example of CGI functionality. You click on a hot spot and the browser sends a request containing the exact location you clicked on (in screen pixels) to the Web server. The Web server has no idea what to make of that, but it does know to call on an image map CGI, which has a table in which screen coordinates are mapped to URLs. It makes a match and passes the correct URL back to Web server, which then knows what to pass back to the browser.



---

*Note: The current design trend is to move such basic functions to the browser. Modern browsers that support client-side image maps make this type of CGI obsolete by downloading a pixel map embedded in the HTML page and making the matches itself. To support older browsers, however, an image map CGI is still required.*

---

CGIs are available that perform a great many functions. For the Mac OS they range from inexpensive shareware hacks written in AppleScript to relatively pricey but faster commercial applications written in C or C++.

The programming interface AppleShare IP uses for CGIs is compatible with other Mac OS Web servers, such as WebSTAR, so you have lots of options from which to choose.

Like Web server data files, CGIs must be stored in AppleShare IP's designated Web Folder. I find it easiest to create a folder named "CGI" within the Web folder and keep all my AppleScripts and applications in there.

## Installing a CGI

By way of example, here is one of my favorite CGIs: Gregory Comb's shareware Count WWWebula. This fun little application gives your site a hit counter that moves up an increment each time someone visits your home page. The counter is displayed in visitors' browsers and can be modified to use a number of numerical styles.

To install Count WWWebula, copy its "Counter" folder into the folder that contains your other CGIs (see Figure 5-28). For this to work, both the "Counter.acgi" application and the "Counter Data Files" folder must be present.

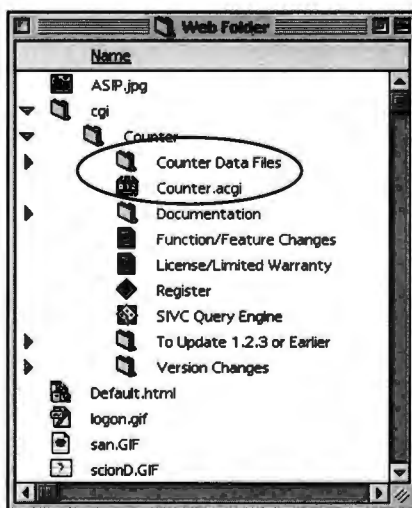


FIGURE 5-29: The Counter folder and Counter.ACGI in the CGI folder of the Web Folder.

To configure Count WWWebula, launch Counter.acgi and select **Preferences** under the **Options** menu bar item. This will open a window showing three tabs. Press the **Referral URLs** tab.

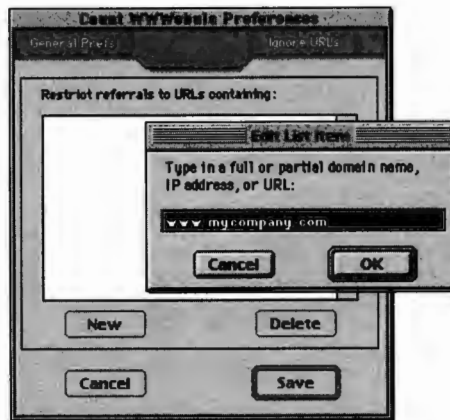


FIGURE 5-30: Configuring referral URLs in Preferences.

Here, press the **New** button to open the **Edit List Item** dialog box. The first time you open this box, type in your Web server's hostname (e.g., "www.scionnet.com"); then press the **OK** button. Press the **New** button again, but this time type your Web server's IP address in the dialog box (e.g., "38.247.58.100").



FIGURE 5-31: Properly configured preferences.

This ensures that only *your* Web server is permitted to use the CGI. If you did not limit this, people could conceivably link to the CGI and use your Web server's processor power to run the counter on their remote Web sites! The author of this software calls it "Counter Piracy."

As it stands, any browser, including yours, visiting the Web pages referenced will trip the counter. Thus, if you want accurate statistics on how many outsiders are visiting your site, make sure that your computer, or your whole domain, is entered under the **Ignore URLs** tab. This ensures that people within your organization will not trip the counter.

Of course, if you want to make it look like your site is very popular, do not do this. In fact, run around to everyone's desks and make your home page the default startup in their browsers' preferences so they trip the counter whenever they surf!

The CGI is now ready to run, but you will need to enter some HTML to place the counter and generate the request from the Web server to trip it. The software's author gives you several options for formatting this.

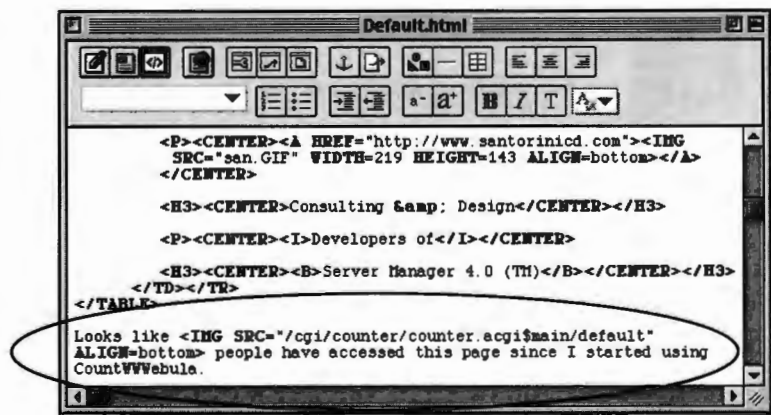


FIGURE 5-32: Triggering the counter from a URL.

Once in place this tag will cause the CGI to activate, adding 1 to the previous statistics and returning a GIF image of the latest numerical count to the browser.



FIGURE 5-33: Result of loading a counter-enabled page.

As you can imagine, CGIs make your Web site a lot more interesting. Even so, they are not without their problems. Here are a few things to watch out for.

## CGI Considerations

CGIs can cause problems in three main areas: security, stability, and performance.

**Security.** The overall security of your AppleShare IP server is easy to set up and maintain, but consider this: Each time you add a CGI, you add



a potential security risk. It is possible in some cases to “hijack” the workings of a CGI on a remote Web server simply by referencing it in a URL. If someone rips off a few processor cycles by tapping into your counter CGI, it is an annoyance rather than a threat; but someone rummaging through your corporate database is quite another matter. To avoid this make sure that, like Count WWWebula and most commercial products, the CGIs you use have security controls such as IP address filtering and user authentication.

On the AppleShare IP side, it is also vital that you permit just read-only access to the everyone category of a folder that contains CGIs. If you do not, you run the risk that someone will upload a malicious CGI that your Web server will dutifully launch.

Do not be afraid of CGIs. Just be aware of how they function.

**Stability.** A lot of development effort went into making the AppleShare IP Web server as crash-proof as possible. When you start introducing CGIs of varying quality and capabilities, however, you can expect that some things are not going to work well together. Be sure to thoroughly and separately test each CGI that you plan to deploy before you commit vital functions to it. Some will give you trouble-free service; others will never do the job consistently and will have to be replaced.

**Performance.** When you launch additional applications on a server, the burden of those services is bound to affect performance. CGIs are no exception, so watch out that they are not choking AppleShare IP and vice versa. You will probably be surprised at how many CGIs you can run before seeing significant performance degradation. Sooner or later, however, your server will slow down. When that happens, consider deploying a second Web server to handle the load of the busier CGIs.

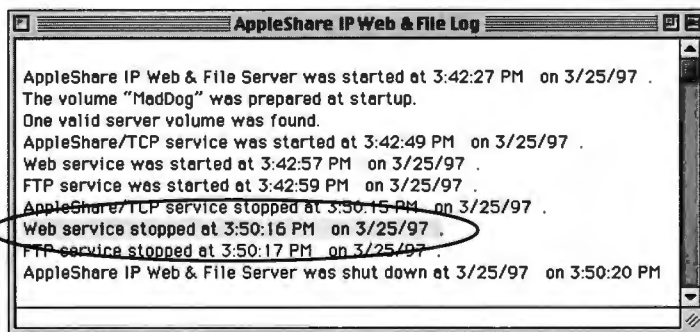
Also, CGIs written in scripting languages such as AppleScript or UserLand's Frontier tend to be slower than those written in compiled languages such as C.

## BASIC WEB SERVER ADMINISTRATION

Basic Web servers, including AppleShare IP, are relatively low maintenance. About all you need to do is monitor the logs to ensure that the service's performance settings are optimal and that no errors are occurring.

### Working with Web & File Log

Significant events, such as when Web service is started and stopped or when errors occur, are recorded in the AppleShare IP Web & File Log file. This file is stored in the AppleShare IP Preferences folder, which is inside the Preferences folder of the System Folder.



---

FIGURE 5-34: Events in the Web & File Log.

### Working with HTTP Log

A more descriptive log is stored in the HTTP Logs folder, also found inside the AppleShare IP Preferences folder. The HTTP Log is generated when you enable Web logging in Web & File Server Admin's Web & File

Server Settings preferences dialog box (as shown in Figure 5-10). You will find it most interesting because it acts as a sort of guest book, recording the source address and actions of each browser that visits your Web site.

As is standard among HTTP servers, AppleShare IP logs its information in this format:

1	2	3	4	5	6	7
03/29/97	03:56:32	OK	193.134.170.34	:Images:image16.gif	5815	
03/29/97	03:56:40	OK	193.134.170.34	:Images:image26.gif		
23390						
03/29/97	04:28:58	OK	193.40.202.21	:Home.HTML 1052		
03/29/97	04:29:07	OK	193.40.202.21	:Images:image16.gif	5815	
03/29/97	04:29:18	OK	193.40.202.21	:Images:image26.gif		
23390						
03/29/97	04:31:29	OK	204.75.141.21	:tech.html 1895		
03/29/97	04:31:29	ERR!	204.75.141.21	:www.scionnet.com	158	
03/29/97	04:39:00	ERR!	204.75.141.21	:www.scionnet.com	158	
03/29/97	04:41:46	ERR!	204.75.141.21	:www.scionnet.com	158	
03/29/97	05:05:36	OK	132.236.77.25	:Home.HTML 1052		
03/29/97	05:05:39	OK	132.236.77.25	:Images:image16.gif	5815	
03/29/97	05:05:42	OK	132.236.77.25	:Images:image26.gif		
23390						
03/29/97	05:05:50	OK	132.236.77.25	:tech.html 1895		
03/29/97	05:05:52	OK	132.236.77.25	:Images:image5.gif	6702	
03/29/97	05:05:52	OK	132.236.77.25	:Images:snetrn.GIF	4995	
03/29/97	06:27:51	OK	200.246.122.2	:Home.HTML 1052		
03/29/97	06:28:04	OK	200.246.122.2	:Images:image16.gif	5815	
03/29/97	06:28:10	OK	200.246.122.2	:Images:image26.gif		
23390						

FIGURE 5-35: Fields in the HTTP Log (viewed in ClarisWorks).



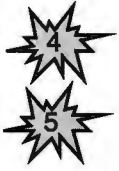
This field contains the date and time during which the action occurred.



This field records the result of the action. If the value is "OK," it means that the browser's request was honored successfully. If the value is "PRIV," it means that the browser requested a URL for a place to which the user does not have the appropriate access privileges. If the value is "ERR!," something went wrong. Perhaps the requested URL was not available. More likely, the user quit the connection before the response was completed.



This field contains the IP address of the browser's computer.



This field contains the actual URL requested.

This field contains the number of bytes sent to the browser in response.

When the HTTP Log grows beyond 32 Mbytes, the Web Server saves it under the date (e.g., HTTP Log 5/26/97) and creates a new one. Eventually logs will eat up all of your server's hard disk space, so archive them as needed.

## Analyzing the HTTP Log with ServerStat

A great utility for analyzing the contents of a Mac OS Web server log is J. Eric Bush's ServerStat from Kitchen Sink Software. It comes in both shareware and commercial versions.



FIGURE 5-36: ServerStat's main window.

This utility is easy to use. Simply point it at the HTTP Log using the **Log File** button, then press the **Start** button. In a few seconds ServerStat spits out a fully formatted log summary in HTML, ready to be opened in any browser.

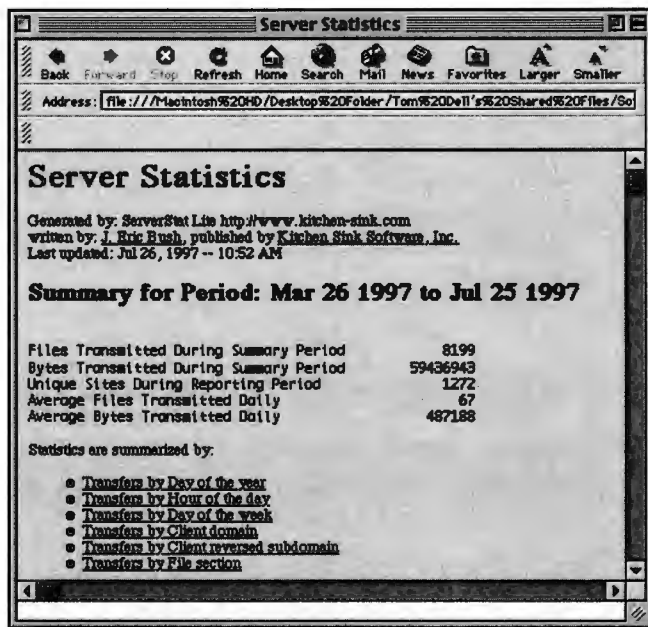


FIGURE 5-37: Viewing the ServerStat output file.

You may now view file transfer statistics for several criteria. Besides showing you where the majority of your Web traffic is coming from, it can tell you which of your pages are most popular. These statistics are also useful in security and performance management.

The HTTP Log will tell you what has been going on with your Web server. To see what is happening in real time, however, you need more advanced analysis tools.

## ADVANCED WEB SERVER ADMINISTRATION

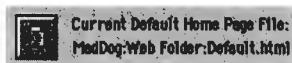
AppleShare IP's core features give you everything you need to monitor your Web server's performance, but only passively. For example, you cannot see who is logged into your Web server in real time, but can only open the log and see who *was* using it. The same goes for monitoring errors. If you do not make a habit of reviewing the HTTP Log, whole sections of your Web site could be missing and you would never know that browsers were not getting the pages requested. A nice add-on to your AppleShare IP Web server, then, is a real time monitoring tool like Open Door Networks' LogDoor.

Another advanced concept you may wish to entertain is the idea of hosting multiple Web sites using a single AppleShare IP Web server. This is possible using another Open Door Networks product, HomeDoor.

### Multisite Hosting with HomeDoor

You have the Web server up and running smoothly at the URL of `http://www.yoursite.com`. It is working so well that another organization offers to pay you big bucks to host "`www.theirsite.com`." As you will see in Chapter 11, assigning a second domain name to your Web server requires nothing more than a simple change to your network's DNS, mapping both of these hostnames to the same numerical IP address.

There is a problem, however—the server has only one default home page. Browsers attempting to access URLs using either domain name will return the same page—whichever one has been designated in AppleShare IP's Web server preferences.



Open Door Networks' HomeDoor solves this problem. It gives your Web server the ability to return as many as 256 unique home pages and therefore to host 256 distinct sites. It does this by intercepting and accepting requests from browsers and then redirecting those requests to particular directories or files on a single Web server.

HomeDoor's methods permit the creation of "virtual domains" and "virtual Web servers." The latter are simply folders residing on a Web server that, from the perspective of Internet browsers, appear to be complete Web servers unto themselves. Virtual Web servers can respond with both default home pages, called up by a URL such as `http://www.theirsite.com`, or directories and files referenced in more specific URLs, such as `http://www.theirsite.com/pages/index.html`.

To do all this, HomeDoor uses a feature of HTTP 1.0 known as *redirection*. Here is how it works:

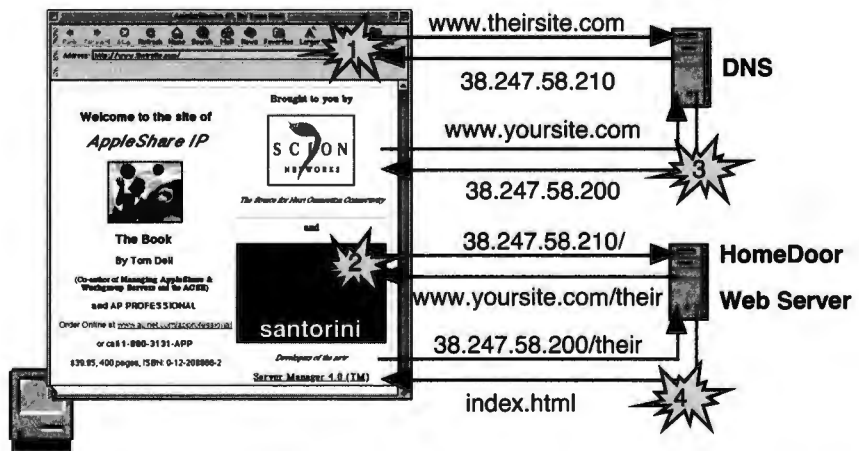


FIGURE 5-38: Using HomeDoor for browser independent redirection.



A browser issues a request for the home page associated with the host-name referenced in a URL (using the GET command). The nameserver resolves the hostname and returns the IP address.



If the IP address referenced in the URL is controlled by HomeDoor, the application accepts the browser's request and returns an HTTP REDIRECT command in response. In the REDIRECT, HomeDoor replaces the IP address with the hostname and path you want returned instead. For example, the URL `http://www.theirsite.com/` might be returned as `http://www.yoursite.com/their/index.html`, where the site of `www.theirsite.com` is nothing more than a folder—or virtual domain—on your server computer.



When the browser receives the REDIRECT command, it turns it around to resolve the new hostname it has been given with the nameserver.



The hostname resolves to your server's IP address, which the browser uses to request the URL HomeDoor gave it (e.g., `http://38.247.58.200/their/index.html`). From then on, the Web server communicates with the browser directly to return any other relative links.

Most Web browsers display the location of the current page they are requesting, usually at the bottom of the browser window. Many will display here the URL to which the browser has been redirected, not just the original URL. If you do not want the real Web server's hostname advertised, you can set up a DNS alias to that server and use HomeDoor to redirect to the alias. For example, instead of redirecting `http://www.theirsite.com` to `http://www.yoursite.com/their/`, as illustrated in Figure 5-35, you can redirect it to `http://www2.theirsite.com/their/`, where `www2.theirsite.com` is a DNS alias to `www.yoursite.com`.

Another clever feature HomeDoor uses is an Internet Control Message Protocol (ICMP) echo responder for each address it supports, which makes it possible for a client to “ping” any of the configured addresses and get a valid response.

## Installing HomeDoor

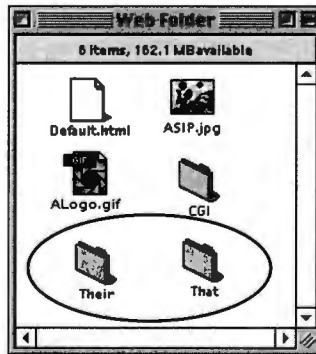
The HomeDoor package includes an extension and a HyperCard-based administration application. It can run on any Macintosh connected to an Ethernet IP network, and not only on the Web server or network that its URLs point to. Before you install it, you will need to work with your ISP or MacDNS to create domain name-to-IP address mappings, and you will



need a unique IP address for each virtual domain that HomeDoor is going to serve.

Imagine that you are going to serve three virtual domains with your Web server: `www.yoursite.com`, `www.theirsite.com`, and `www.thatsite.com`. Let's assume that `www.yoursite.com` resolves to the IP address 38.247.58.200. First, you assign two unique and *contiguous* IP addresses from the network's IP address range, say 38.247.58.210 and 38.247.58.211. Your nameserver maps the hostnames `www.theirsite.com` and `www.thatsite.com` to these IP addresses. (Note that I left several IP addresses open between the real Web server and the virtual Web servers, because I might need those open addresses for additional real Web servers if I form a RAIC.)

Next, you create folders for each virtual domain inside AppleShare IP's designated Web folder. Copy each site's Web pages into these folders.



---

FIGURE 5-39: Creating folders for virtual domains.

To actually install HomeDoor, simply copy the HomeDoor extension into the System Folder's Extensions folder and restart. Next, launch the HomeDoor Admin application.

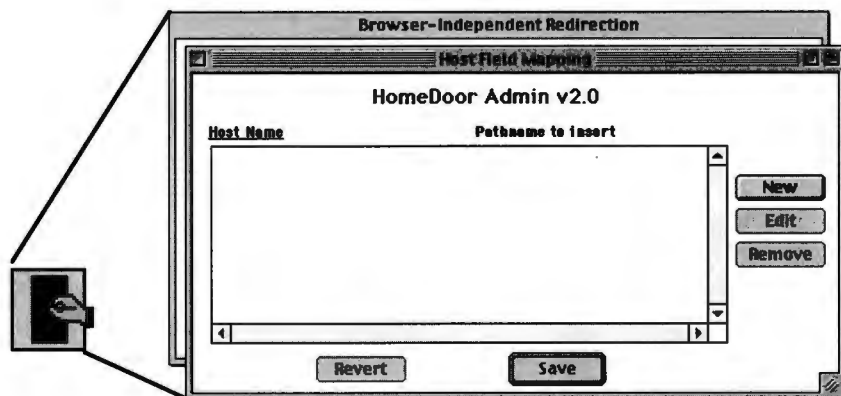


FIGURE 5-40: HomeDoor Admin's opening windows.

When HomeDoor Admin is launched, it displays windows for two methods of multihosting: host field mapping and browser-independent redirection. We are only concerned with the latter here, so close the Host Field Mapping window.



*Note: Browser-independent redirection has been implemented in the product since version 1.0. This method assigns one IP address to each virtual domain that is to be hosted by the Web server. Since the original HTTP 1.0 protocol expects the Web service for each domain to have its own unique IP address, browser-independent redirection works with all Web browsers.*

*In version 2.0, HomeDoor began providing the second option of host field mapping. This is an HTTP 1.1 technique that permits multidomain Web services to be provided using only a single IP address. This method works with most—but not all—browsers. It also requires an HTTP 1.1-compatible Web server.*

In the Browser-Independent Redirection window you will see a couple of examples that Open Door Networks has entered for you. Press the **New IPs** button, and these will be overwritten.

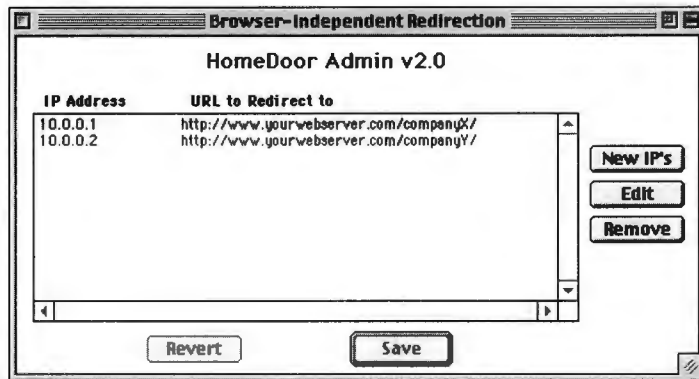
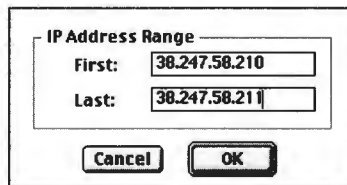


FIGURE 5-41: Examples in the Browser-Independent Redirection window.

In the IP Address Range dialog box that opens, enter the first and last IP address in the range HomeDoor will serve. This range should not include the Web server's native address (i.e., 38.247.58.200), because the default home page for [www.yoursite.com](http://www.yoursite.com) should be returned to browsers directly by AppleShare IP without the interference of HomeDoor. Press the **OK** button when you have finished.



The IP address range will now appear in the Browser-Independent Redirection window. Highlight the first IP address in the list and press the **Edit** button.

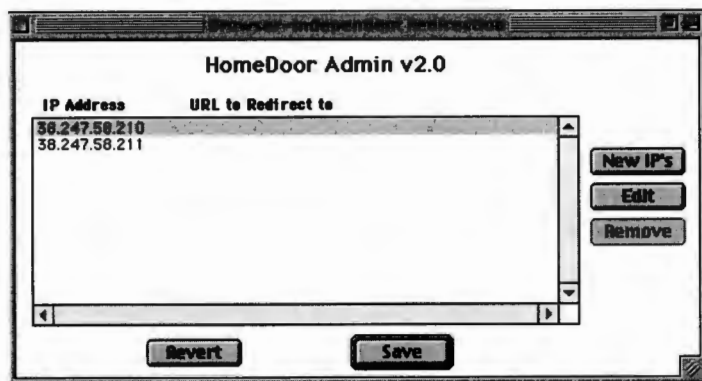
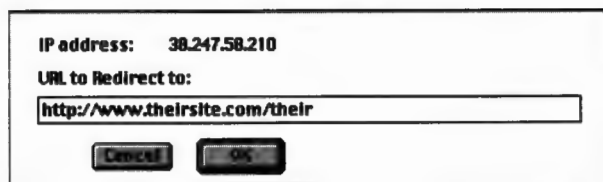


FIGURE 5-42: Editing the IP address listings.

In the URL to Redirect to dialog box that opens next, enter a URL that contains the virtual Web server's hostname and the valid pathname. In this case, the URL associated with an IP address must point to the directory that will serve as the virtual domain's "root," and not to a specific file. That means that the URL `http://www.theirsite.com/theirs` is okay but that `http://www.theirsite.com/theirs/index.html` is not.



Edit the listings for each IP address in the range, pressing the OK button each time when you are finished. (By the way, you can use URLs for other services, such as FTP, as well.)



FIGURE 5-43: Editing in the Browser-Independent Redirection window.

Then press the **Save** button in the Browser-Independent Redirection window.

You can choose the **Redirection Prefs** command under the **File** menu bar item to enable or disable redirection and logging.

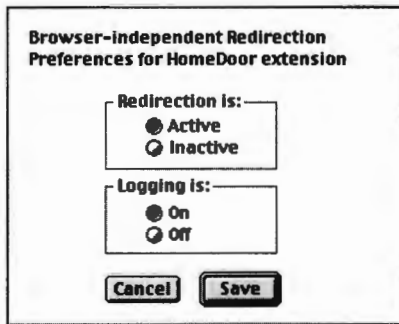


FIGURE 5-44: Enabling logging in Redirection Preferences.

Otherwise, you have successfully installed HomeDoor, and you may now test it. You will need to do this from a browser running on another computer because you cannot access home pages implemented with browser-independent redirection from the same computer on which the HomeDoor extension is installed.

## Redirect Limitations

Here, according to Open Door Networks, are some of browser-independent redirection's limitations:

- It only works over the default HTTP port: 80.
- It only works on Ethernet-based IP networks.
- The HomeDoor extension will only load if MacTCP or Open Transport version 1.1 or later is running on the computer. In addition, only built-in Ethernet is supported under Open Transport.
- The HomeDoor extension will not run on a computer that is also running the Apple IP Gateway.
- If HomeDoor and other TCP/IP services are sharing the same Ethernet port, the HomeDoor extension must load before any other extension that opens MacTCP.

## Multisite Monitoring with LogDoor

LogDoor, another Open Door Networks product, provides a real-time domain-by-domain display of hits to your Web server. If you are hosting a single domain, LogDoor provides greater insight into your server's daily operations. If you are hosting multiple domains, it produces separate log files and summaries for each of them.

LogDoor is not designed simply to analyze your server's HTTP Log (or HomeDoor's log). Rather, it is a Web server monitor that provides immediate information on how your server is being used. If you prefer, LogDoor's processing can also be done off-line after the log file has been closed and traffic is minimal, but this is a waste of its abilities.

To use LogDoor, select the **New Task** command from the **File** menu bar item. This opens the Task and Activity windows, which have the following components:

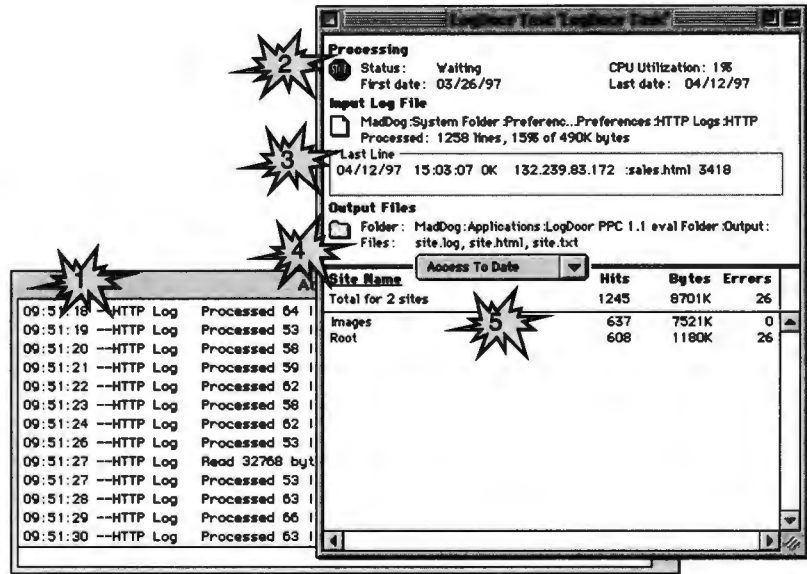


FIGURE 5-45: LogDoor's Task window.



The Activity window shows you what operation LogDoor is currently conducting.



The processing area contains a button that reads either **Stop** or **Go** depending on LogDoor's operational status. It also contains fields to tell you if LogDoor is "processing" or "waiting," the first and last dates recorded in the HTTP Log, and the percentage of processor time that is being used.



The HTTP log you wish to work with is selected in the Input Log File field. There is also a listing for the last message in the current log, which will be the most recent transaction if you are monitoring the log in real time.



The Output Files field shows you where LogDoor is storing its reports. This will usually be in the same folder that contains LogDoor.



Here statistics for each folder in the designated Web Folder are displayed, arranged as “sites.” LogDoor sees a site as a folder at the Web server’s “root” level. Thus, the designated Web Folder is one site, and an “Images” folder within it can be considered another. Going back to the HomeDoor example, LogDoor displays access information and produces log files and summaries for `www.yoursite.com` (Web Folder) as well as `www.theirsite.com` (their folder) and `www.thatssite.com` (that folder).

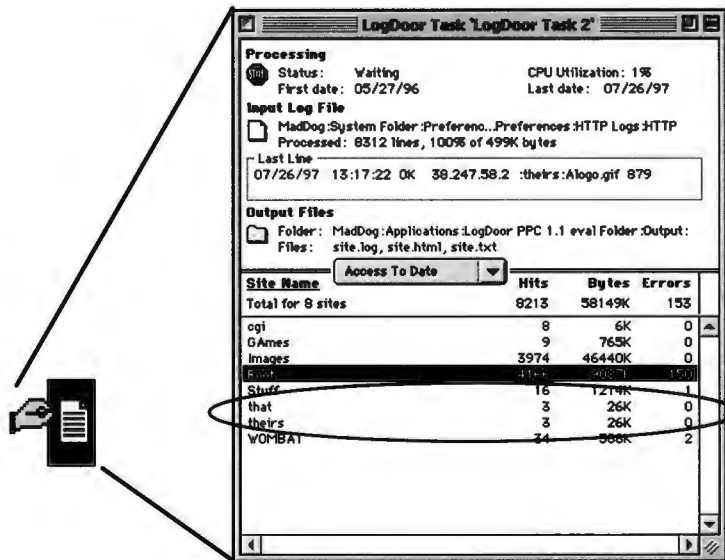


FIGURE 5-46: Folders seen as sites by LogDoor.

LogDoor can create three files for each site. A Site Log file includes every line from the input log file that references a URL for that folder. A Site processing summary is created in HTML periodically, or on demand, to summarize the processing that LogDoor has performed for a site. A second Site processing summary is written in tab-delimited text format instead of HTML.

LogDoor will also generate summaries for Web server activity overall.



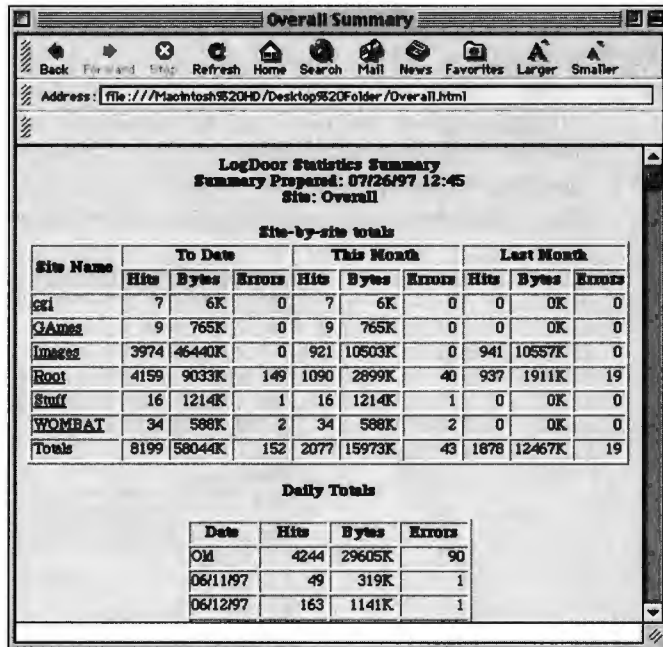


FIGURE 5-47: Creating HTML summaries of overall Web server activity.

## SUMMARY

The AppleShare IP Web server uses HTTP to dole out HTML pages to browsers on an Intranet or on the Web. Unlike other HTTP 1.0 Web servers, however, AppleShare IP uses a method of “keep-alive” that maintains client connections instead of dropping them immediately after a hit.

It is possible to create an AFP/TCP connection with a Web browser that has been modified with AFP Engage! It is also possible to navigate the

Web server's folders with a browser using AppleShare IP's automatic directory listing feature.

A Web server's main network entrance is its home page. Home pages are easy to create using a text editor or HTML editor.

The real power of a Web server is its ability to use CGIs. AppleShare IP's Web server employs the same CGIs used by other Mac OS servers, such as WebSTAR, and supports MIME. Because CGIs might pose a security risk, they should be configured carefully.

Basic Web administration involves monitoring the Web server's HTTP and event logs to look for errors. Tools such as ServerStat and LogDoor help to sort and better present the information in these logs.

It is possible to host multiple Web sites on a single Mac OS server. This requires changes in the network's DNS tables and works best if additional tools such as HomeDoor and LogDoor are employed. HomeDoor redirects browser requests to virtual domains that appear to be separate Web servers. LogDoor provides usage statistics for each virtual domain.



# 6

## AppleShare IP Mail Server

Email has had an interesting history on the Mac OS. It was once a market dominated by robust, proprietary systems such as CE Software's QuickMail and Microsoft's MS Mail (now Quarterdeck Mail). These were closed, LAN-based systems with their own client-server architectures that could not talk to each other without using gateways. The most popular gateways were those of StarNine (now a division of Quarterdeck), such as Mail\*Link UUCP and Mail\*Link SMTP. Mail\*Link UUCP provided LAN-to-Internet connectivity, generally over dial-up lines, via the UNIX-to-UNIX Copy Protocol (UUCP). Mail\*Link SMTP provided LAN-to-Internet connectivity, generally over full-time Internet feeds, via the Simple Mail Transfer Protocol (SMTP). In both cases they had the same purpose. They opened these closed systems to the rest of the

world without compromising the features that their users had come to enjoy in the proprietary products.

Beginning with System 7 Pro, Apple provided a new way for networked Macintoshes to communicate with each other through a built-in Apple Open Collaboration Environment (AOCE) and PowerTalk. Like the other Mac OS-based systems, it could be used in a client-server model when communicating with Apple's PowerShare servers. Unlike the other systems, however, it could also be used peer-to-peer. In both implementations it could be extended to communicate with commercial on-line services, the Internet, fax machines, and pagers using inexpensive gateway software. It was a neat model, but it never caught on.



---

FIGURE 6-1: Apple's email on the desktop: PowerTalk.

Apple chose to move away from the proprietary PowerTalk model and focus instead on the open TCP/IP-based standards of the Internet. It bought Glenn Anderson's nifty shareware application MailShare and upgraded it to become the Apple Internet Mail Server (AIMS). AIMS is a Post Office Protocol (POP) and SMTP host that works nicely with inexpensive email clients such as Qualcomm's Eudora and Claris' Em@iler. It runs on even the lowly MacPlus, and, in a move that endeared many Mac OS administrators, Apple gave it away for free.



FIGURE 6-2: Apple Internet Mail Server: ugly interface, great program!

AIMS held the line until the release of AppleShare IP 5.0. The new mail server can use an AppleTalk-enabled client, such as Claris' Em@iler Lite, which is bundled with Mac OS 8, and any Internet-enabled POP3 clients (also a capability of Em@iler). The server is fast, has a simple interface, and is fully integrated with AppleShare IP's Users & Groups Data File and MIMEs.

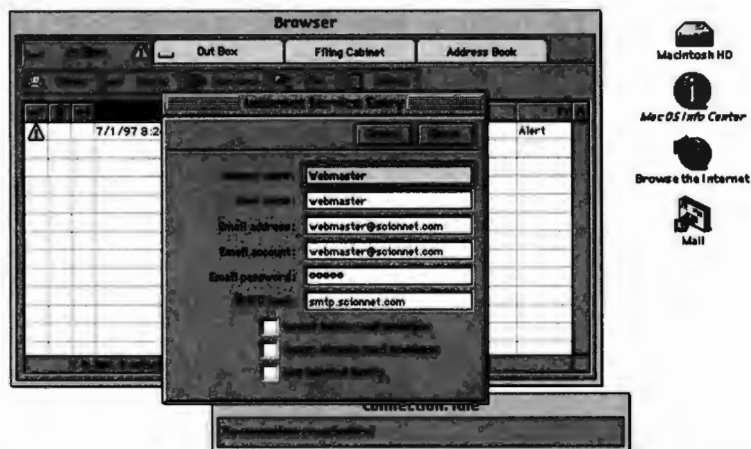


FIGURE 6-3: Apple's email on the desktop: Claris Em@iler Lite.

In this chapter I will show you how to set up and maintain the AppleShare IP Mail Server. As a bonus, I will also show you how to provide mailing list and email-on-demand services using another Mac OS-based server, StarNine's ListSTAR. I will talk about email clients in Chapter 8.

## HOW EMAIL WORKS

Email was once a novelty, but now it is as vital to your organization's communications as the telephone, fax, or pager. As early as the 1960s, people were leaving messages for each other in mainframe-based mail boxes (e.g., IBM's PROFS). This same model is still employed by commercial on-line services and Bulletin Board Services (BBSs). Email was not originally intended to be a network application, but it was easily adapted to become one using TCP/IP.

The original model for email communications works like this: A sender creates a message within a User Agent (UA), which we more commonly refer to as an email client application. The UA, which runs on the user's host computer, communicates with a Message Transfer Agent (MTA), which resides on a mail host (mail server). Where two UAs are local to the same MTA, email is passed between the UAs. Where UAs are local to different MTAs, the MTAs pass the email between each other and then, ultimately, the UAs. The whole process is referred to as the Message Transfer System (MTS).

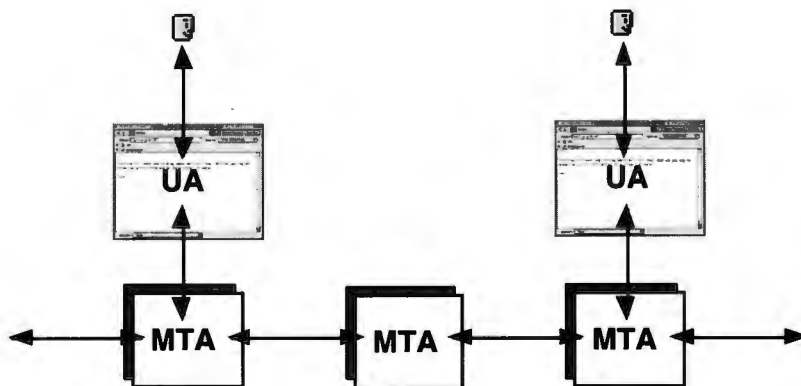


FIGURE 6-4: Model of the Message Transfer System.

The structure of a message is important to the process. It has three parts: the body, the header, and the envelope. The body contains the text that the sender wants the recipient to read. The header contains information about the message itself, such who sent it, when it was sent, its subject, the sender's return address, and the recipient. All of this is enclosed in an envelope that provides MTAs with sender and recipient information.

```

Header
Received: from relay2.smtp.psi.net by smtp.trdell.com (AppleShare IP Mail
Server 65.112108) id 80 via TCP with SMTP; Tue, 29 Jul 1997 13:24:53 -0800
Received: from smtp.scionnet.com by relay2.smtp.psi.net (8.8.3/SMI-5.4-PSI)
id QAA07036; Tue, 29 Jul 1997 16:17:31 -0400 (EDT)
Received: from [38.247.58.4] by smtp.scionnet.com with SMTP (Apple Internet
Mail Server 1.1); Tue, 29 Jul 1997 13:24:51 -0800

Subject: Want to go up the hill?
Date: Tue, 29 Jul 97 13:17:40 -0800
X-mailer: Claris Emler 2.0v2, June 6, 1997

From: Jack <jack@smtp.scionnet.com>
To: "Jill" <jill@scionnet.com>

Mime-Version: 1.0
Content-Type: text/plain; charset="US-ASCII"
Message-ID: <1341939805-213227558@smtp.scionnet.com>

Body
Jill,

You know, all work and no play makes me a dull boy. What do you say we
break early for lunch and go fetch a pail of water.

Jack

```

FIGURE 6-5: Anatomy of an email message.



You are probably familiar with most of the terminology surrounding TCP/IP-based email. For instance, a valid email address includes a user name, which is associated with a hostname, separated by an “@” sign like so:

Hostname  
jill@smtp.trdell.com  
User Name                      Domain Name

This address does not designate a user’s host computer but rather a mail host on which the user has an account. (For simplicity many administrators configure their DNS in such a way that the organization’s domain name resolves to the mail host’s IP address as well. For example, “jill@trdell.com” would work just as well as “jill@smtp.trdell.com.” See Chapter 11 for details.)

On the Internet, mail hosts use SMTP to move messages back and forth. This works fine for servers, but it makes less sense for client computers, which need only a few of the features of SMTP. POP was developed so that users do not need a full SMTP server on their desktop computers. When users wish to check for, read, and delete email, their email clients use POP. When they want to send email, their clients use SMTP. It works like this:

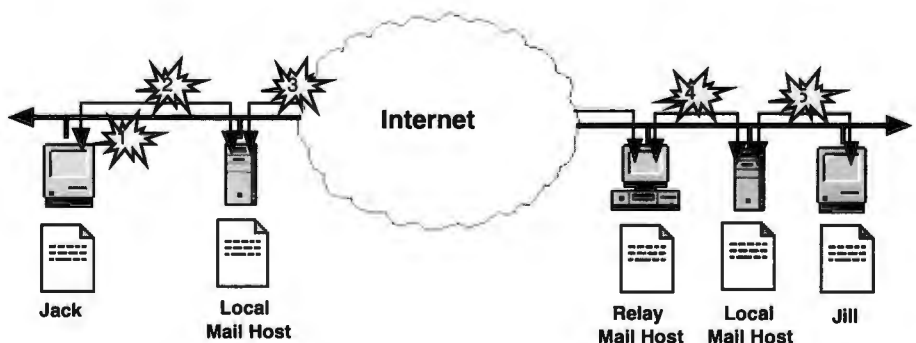


FIGURE 6-6: Typical SMTP/POP email transaction.

1. Jack wishes to send a message to Jill. He writes the message and presses the **Send** button in his email client software.

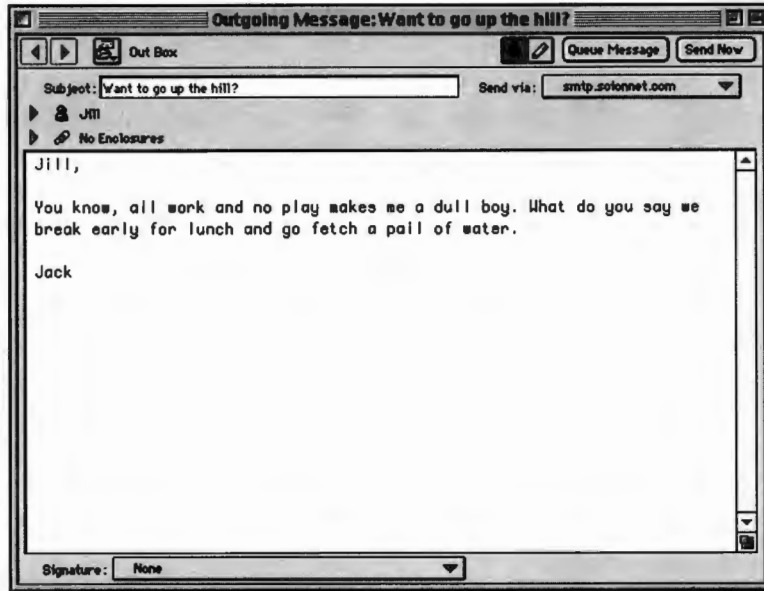


FIGURE 6-7: Example of an email client: Claris' Em@iler.

2. The email client adds a header and requests a connection with Jack's local mail host on TCP port 25. The mail host responds with a server ID and a message that it is either available or busy.

If the mail host is available, the TCP connection continues and the client sends a HELO command along with a fully qualified domain name. If the mail host accepts the connection, it responds with its own domain name. The client then sends the server a MAIL FROM: (sender) command, followed by a RECP TO: (recipient) command, followed by a DATA command. At each step the server must acknowledge that it is ready to receive the information. When the client has finished, it sends a simple "." (period) to the server to signify that it is finished. The server acknowledges and invites the client to send another message or to QUIT.

3. Jack's local mail server stores the message on its hard disk. Eventually, it initiates a connection with a mail server on Jill's network via the Internet. This mail server is not actually Jill's local mail host but rather one among many mail servers that has been singled out to connect to the Internet. It is referred to as a relay mail server.
4. The relay mail server stores the message on its hard disk. Eventually, it forwards Jack's message to Jill's local mail host, which in turn stores the message on *its* hard disk.
5. According to a schedule established by Jill, her email client opens a POP connection with her local mail host, allowing her to read the message.

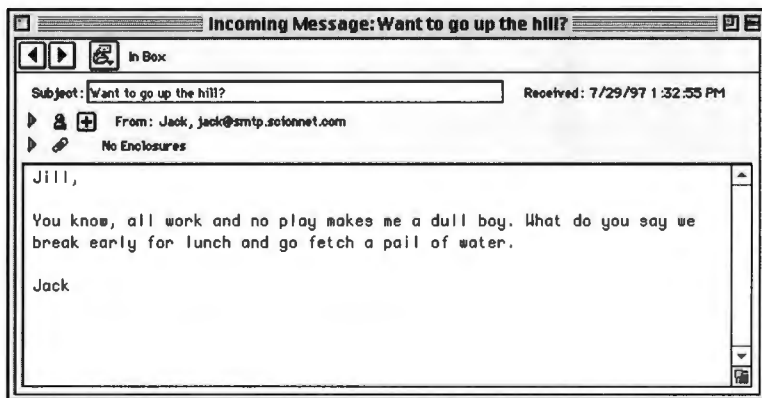


FIGURE 6–8: Reading an email message in Claris' Em@iler.

This is the same model employed by the AppleShare IP Mail Server. It is a complete SMTP/POP mail host, so it can communicate with servers and clients on platforms other than the Mac OS. In addition, it can communicate with other Mac OS-based servers and clients using AppleTalk. For example, the relay mail host on Jill's network could have transferred the previously mentioned message to Jill's local mail host via TCP/IP. Then Jill's email client could have read it from the local AppleShare IP server using AppleTalk.

This same store-and-forward methodology works between multiple AppleShare IP servers on a LAN. Rather than having users log in to mul-

multiple servers to retrieve email delivered to multiple accounts, you should configure your AppleShare IP servers so that each user retrieves email from just one server.

Imagine that Jack and Jill are users on the same LAN and that the LAN has two AppleShare IP servers: “AppleShare 5 Server” and “Office Mail.” Jack and Jill are registered users of both AppleShare IP servers, so both may copy files to and from either file server. Only Jack’s account on “AppleShare 5 Server” is enabled to receive email, however, as is Jill’s account on “Office Mail.” Whenever Jack and Jill want to send messages to each other, it is up to the two AppleShare IP servers to forward the messages to each other. Jack’s email client can then retrieve all of his email from “AppleShare 5 Server.” He does not need to log on to “Office Mail” separately to read a message from Jill.

## ESTABLISHING MAIL SERVICES

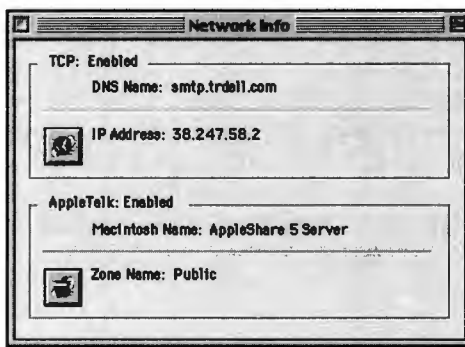
If you have already created user accounts and assigned Internet aliases, as discussed in Chapter 4, then you have done half of the work necessary to establish AppleShare IP mail services. Here is what you need to know to do the rest.

### Configure DNS

Mail hosts have special DNS requirements in addition to the usual IP address-to-hostname mappings required by other servers. Besides the Address (A) record, name servers must also identify mail hosts with Mail Exchanger (MX) records. If your network’s DNS is provided by an ISP or a larger IS department, you will need to work with its technicians to add an appropriate hostname and MX record to the IP address mapping of your AppleShare IP server. The Mail Server is compatible with all stan-

dard implementations of DNS. If your network does not already have DNS, you can employ MacDNS, as described in Chapter 11.

You can view the DNS information associated with your server computer by selecting the **Show Network Info** command from AppleShare IP Manager's **Manager** menu bar item.



---

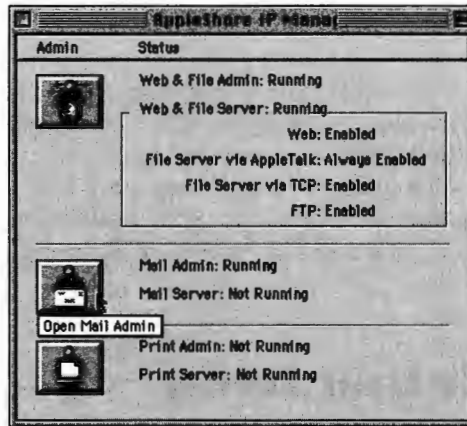
FIGURE 6–9: Viewing AppleShare IP Manager's Show Network Info window.

In addition to the server's hostname and IP address, this window displays the computer's Macintosh name and AppleTalk zone. (This is for the server's default port only; the mail server does not support multihoming.)

The AppleShare IP server may use multiple hostnames. For example, "www.yoursite.com," "ftp.yoursite.com," and "smtp.yoursite.com" can all resolve to the same IP address.

## Launch Mail Admin

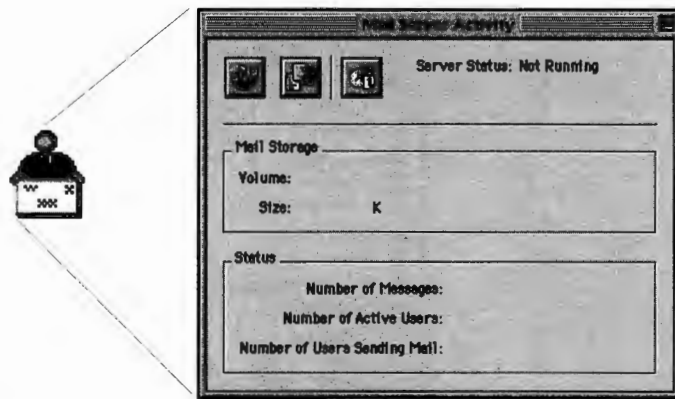
To use the Mail server for the first time, launch the Mail Admin application. If you have AppleShare IP Manager running, press the second button in the window (or choose the **Open Mail Admin** command under AppleShare IP Manager's **File** menu bar item). You can also double-click on the application directly.



---

FIGURE 6-10: Launching Mail Admin from AppleShare IP Manager.

This will open a password dialog box, in which you must enter the **Administrator Name** and **Password**. Press the **OK** button when you have finished. The Mail Server Activity window will appear.



---

FIGURE 6-11: AppleShare IP Mail Admin and Its Mail Server Activity window.

This window is designed to tell you if the server is running or stopped, how much email is stored on the hard disk, and how busy the server is sending email.

## Launch Mail Server

If the Mail Server application is not already running, you can launch it manually by choosing the **Start Mail Server** command under Mail Admin's **Server** menu bar item (or by pressing the **Command (⌘)-[** key combination). No additional interface will be presented, but the Server Status line in Mail Admin's Mail Server Activity window will change to read "Starting Up," and then "Running."

## Enable User Access

The Mail Server looks to the Users & Groups Data File for information about the accounts for which it should receive and deliver email. This information can be modified by opening user accounts in the Users & Groups List.

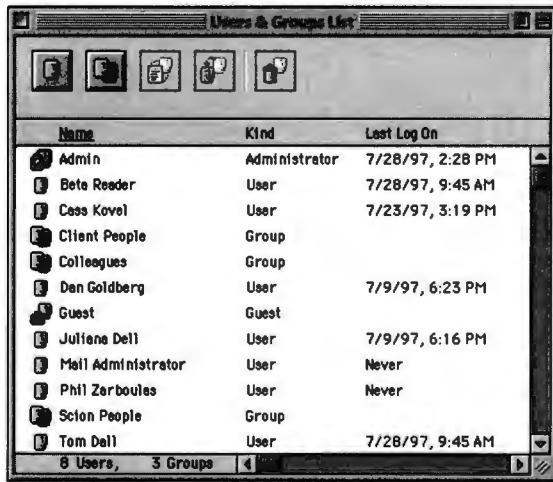


FIGURE 6-12: Opening the Users & Groups List.

As we discussed in Chapter 4, it is important that each user who will have email be given an Internet alias. A valid Internet alias must be unique and

consist of alphanumeric characters. It is not case-sensitive, and some “special” characters are permitted:

! # \$ % & ' \* + - / = ? ` { } | ^ \_ ~ .

You cannot type in an Internet alias that is the same as the name you typed in the **Name** field. If you want them to be the same, leave the **Internet Alias** field empty and then make sure that the name in the **Name** field is valid according to the criteria required of an Internet alias.

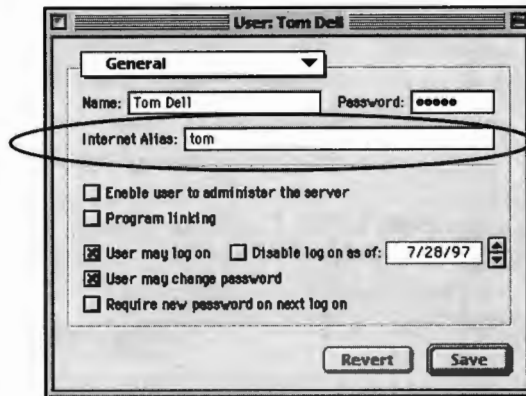
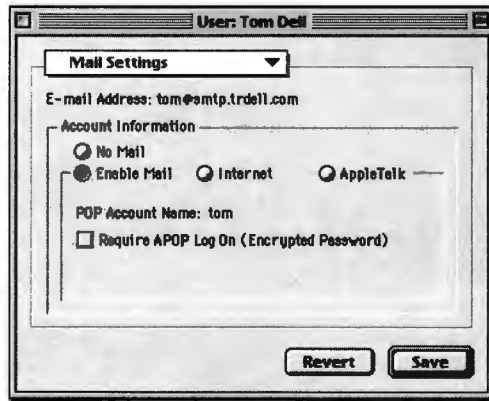


FIGURE 6-13: Entering an Internet alias.

Other criteria can be entered in the User window under **Mail Settings** in the pop-up menu. Note that the Internet alias is used in the email address that appears near the top of the window. This will be the user’s return address. Press the **Enable Mail** button to give the user email access. The User window will change to display the user’s POP account name.





---

FIGURE 6-14: Configuring user mail settings.

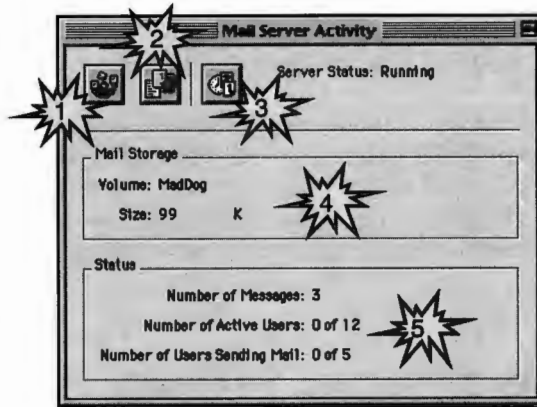
If the user's email client will be using Authenticated Post Office Protocol (APOP), also enable the **Require APOP Log On** checkbox. When APOP is selected, the email client encodes the user's password so that it cannot be observed by a "protocol sniffer."

You may disable a user's email access by pressing the **No Mail** button. The Mail Server will then deny access to the user and will no longer accept email for that account. Any email that was not retrieved will remain in the Mail Database. The only way to remove that mail is to re-enable user access.

When you delete a user altogether, the Mail Server removes the user's email from the Mail Database.

## BASIC MAIL SERVER ADMINISTRATION

The Mail Server does not have a window of its own. Its workings are reflected in Mail Admin's Mail Server Activity window. Its parts are as follows:



---

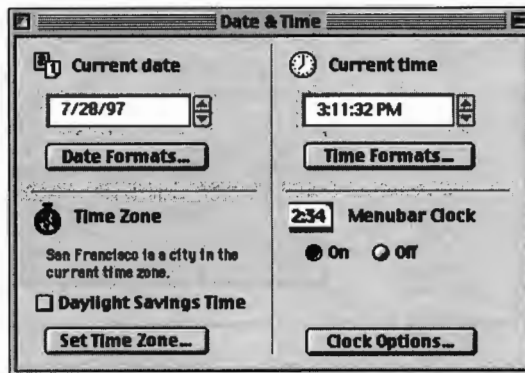
FIGURE 6-15: Parts of Mail Admin's Mail Server Activity window.



This button launches AppleShare IP Manager.

This button opens the Users & Groups List.

This button opens the Mac OS Date & Time control panel. It is important to configure the server with the correct date, time, and time zone. The Mail Server time stamps each message, and an incorrect time stamp may cause other mail servers to mishandle a message.



---

FIGURE 6-16: Configuring the Date & Time control panel.



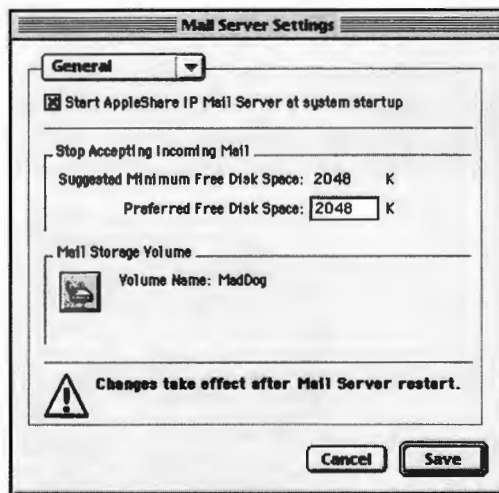
The Mail Storage field displays the size of the Mail Database as well as the hard disk on which it is stored.



The Status field displays several counters. The Number of Messages status line displays the total number of messages in the Mail Database. The Number of Active Users status line displays the number of users who are retrieving email. The Number of Users Sending Mail status line displays the number of users who are sending email.

## General Server Settings

To make the Mail Server launch automatically whenever the computer is booted, select the **Mail Server Settings** command from Mail Admin's **Server** menu bar item; then choose **General** in the pop-up menu. Here, enable the **Start AppleShare IP Mail Server at system startup** checkbox.



---

FIGURE 6-17: Configuring the server's General options.

The Mail Server will use up all available hard disk space for its Mail Database except the amount you enter next to **Preferred Free Space** (in Kbytes) in the Stop Accepting Incoming Mail field. Apple recommends that you leave at least a dangerously low 2 Mbytes. I recommend that you leave no less than 20 Mbytes.

You can also choose a different volume for the Mail Server to store the Mail Database on, in the Mail Storage Volume field. The Mail Database is stored in the “AppleShare IP Mail Folder” at the top level of the startup disk by default. You must stop the Mail Server, move the AppleShare IP Mail Folder to the new volume, and then restart the Mail Server to complete this operation. Verify that the Mail Server is storing mail on the correct volume by checking the Mail Server Log.



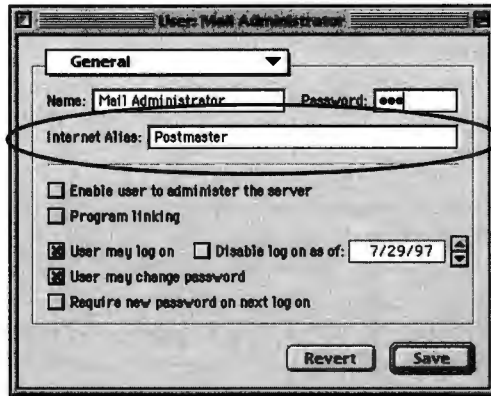
---

*Note: The Mail Server will reset the access privileges of the AppleShare IP Mail Folder to None for the User/Group and Everyone categories automatically. This prevents unauthorized access to the Mail Database file.*

---

## Mail Administrator

When the Mail Server is installed, AppleShare IP automatically creates a mail administrator account with email access enabled. The account is otherwise disabled and does not have a password.



---

FIGURE 6-18: The mail administrator account.

All SMTP mail hosts on the Internet are required to have an account under the name "postmaster" (per RFC 822, the *Internet Standard for the Format of ARPA Internet Text Messages*). This rule was adopted to allow administrators to contact their counterparts on other systems when problems arise. Under AppleShare IP, the mail administrator account serves this function by using the Internet alias "postmaster."

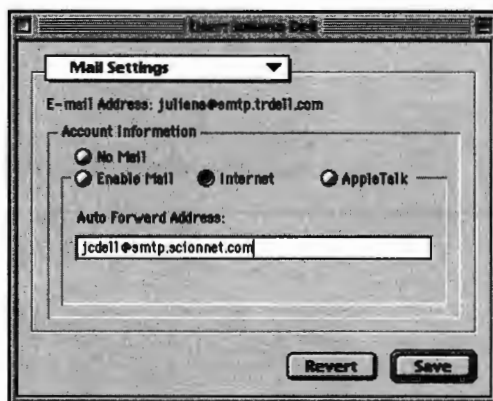
Do not disable or change the Internet alias of this account. However, if you would rather have administrator-level traffic come your own account, you may forward the email from this account to yours.

## Forwarding the Mail

AppleShare IP can forward email from one account to another and from one mail server to another using either AppleTalk or TCP/IP.

## Over TCP/IP

If you want the Mail Server to forward email addressed to a user on another mail server over TCP, enable the **Internet** button in the User window under the **Mail Settings** pop-up menu. A valid email address must be entered in the Auto Forward Address field.

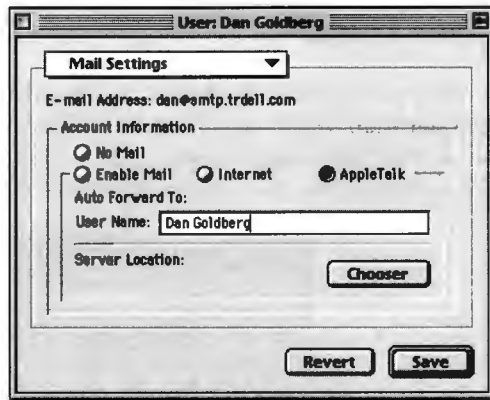


---

FIGURE 6-19: Forwarding the mail over TCP/IP.

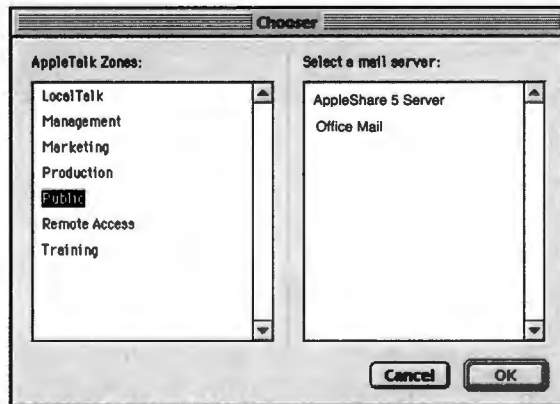
## Over AppleTalk

If you want the Mail Server to forward email addressed to a user on another AppleShare IP server over AppleTalk, enable the **AppleTalk** button in the User window under the **Mail Settings** pop-up menu. A registered user name must be entered in the Auto Forward To field (not an Internet alias). Next, use the **Chooser** button to open a dialog box in which you can select the other AppleShare IP server.



---

FIGURE 6-20: Forwarding the mail over AppleTalk.



---

FIGURE 6-21: Selecting AppleShare IP Server to receive user email.

## Staying in Sync

One way to synchronize the Users & Groups Data Files on multiple AppleShare IP servers is to create all of the necessary user accounts on one machine first and then export them to other servers. This is done by

selecting all of the accounts in the Users & Groups List and choosing the **Export Users and Groups** command from Web & File Server Admin's **File** menu bar item.

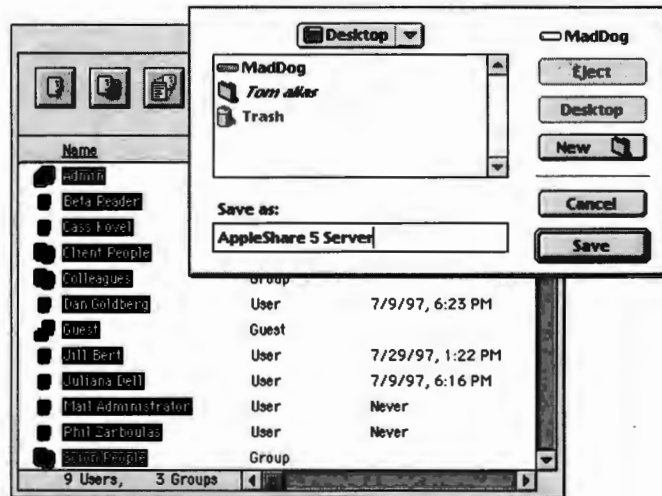


FIGURE 6-22: Exporting users and groups.

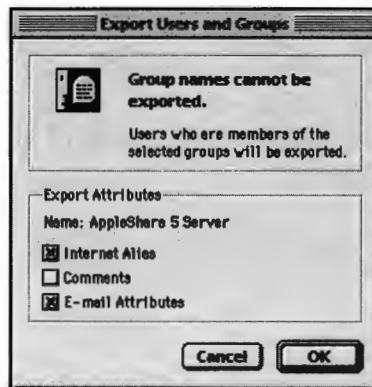


FIGURE 6-23: Maintaining Internet aliases and email attributes.



After you press the **Save** button, be sure to use the dialog box that appears next to preserve the accounts' Internet aliases and email attributes. You may then import the resulting file into each Mail Server. (Santorini's Server Manager offers easier options. See Chapter 9.)

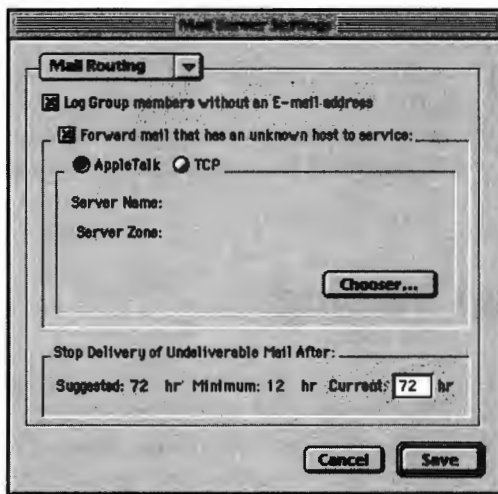
For users local to a given Mail Server, simply enable email access in their accounts. For users local to another Mail Server, enable email access to their accounts but forward their email to their local server.

If you set up new forwarding for a user, the Mail Server immediately begins forwarding that account's email. The user must connect to retrieve any email that was stored in the Mail Database before the Mail Server began forwarding.

## Routing Email

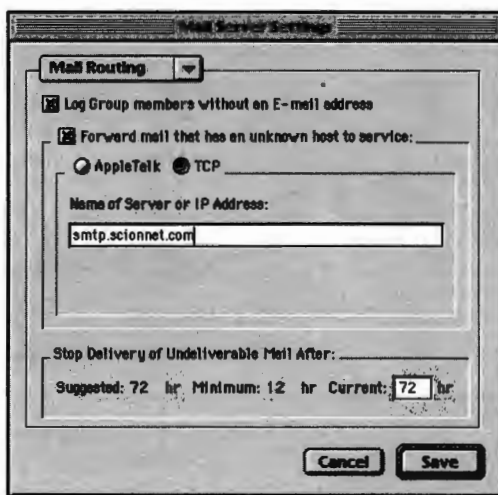
Email addressed to a computer with an IP address that the Mail Server cannot obtain via DNS is said to be destined for an "unknown host." In such situations it is customary to forward the email to a relay mail host to which the destination might be known. For example, email addressed to users on your local network is delivered directly, but email destined for users on the Internet may be routed through an SMTP mail host operated by your ISP.

To forward email to a relay mail host, select the **Mail Server Settings** command from Mail Admin's **Server** menu bar item. In the Mail Server Settings dialog box that appears, select **Mail Routing** in the pop-up menu. Next, enable the **Forward mail that has an unknown host to service** checkbox.



---

FIGURE 6-24: Enabling mail routing over AppleTalk.



---

FIGURE 6-25: Enabling mail routing over TCP/IP.

If the relay mail host is another AppleShare IP server, perhaps the only one of several that is connected directly to the Internet, you can forward the email using AppleTalk. This is configured in the same way that you forward between user accounts. If you do not wish to use AppleTalk, or if the relay mail host is not an AppleShare IP server, press the **TCP** button and identify the relay mail host by hostname or IP address.

## Group Mailings

Users may send email to an entire AppleShare IP group as easily as to a single user. All they need to do is specify the group name as a recipient. When the Mail Server receives a message addressed to a group, it delivers a copy of the message to each user in the group.



FIGURE 6-26: A group and its membership.



*Note: If you expect users to address messages to groups, be sure that the group names conform to the same conventions required for Internet aliases.*

## Increasing Concurrent Connections

The Mail Server permits 12 concurrent POP connections (for retrieving email) and 5 concurrent SMTP connections (for sending email) by default. To increase the number of available concurrent POP and SMTP connections, you must allocate additional memory to the Mail Server. Each megabyte of additional memory permits five more concurrent POP connections and three more concurrent SMTP connections.

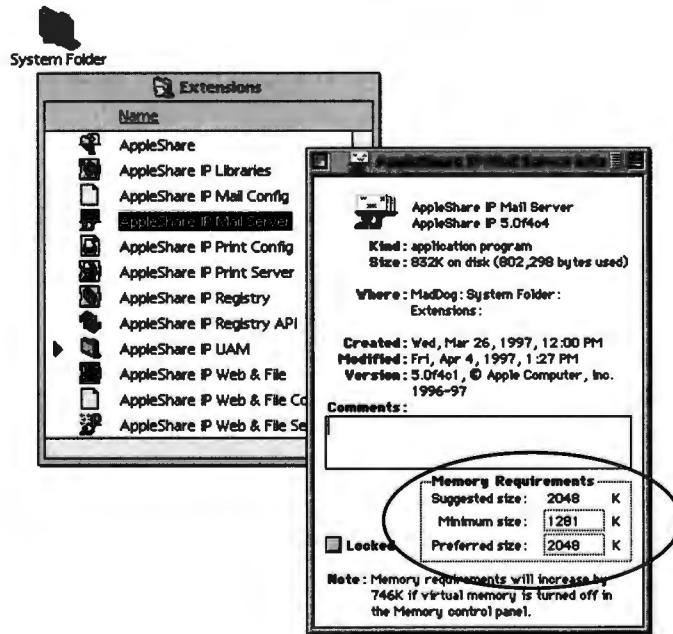


FIGURE 6-27: Allocating more memory to the Mail Server.

According to Apple, each POP or SMTP connection can support between three and five users if they typically send and receive small messages. You should allow for between two and four users per POP or SMTP connection if they typically send and receive large messages or if they connect to the Mail Server frequently. Allocating more memory also shortens the time it takes for users to retrieve large messages.

To allocate additional memory to the Mail Server, select the AppleShare IP Mail Server extension in the Extensions folder of the System Folder, and choose the **Get Info** command from the Finder's **File** menu bar item. Next, increase the memory allocation in the **Preferred size** field.

A limitation that you should be aware of is that the maximum number of messages a user can retrieve in one POP connection is 2048. If the user has more than that on the Mail Server, he will have to delete some messages, disconnect from the Mail Server, and then reconnect to it.

## Working with Outgoing Messages

In addition to Mail Server activity, you can get a look at the server's workings by viewing the contents of the Outgoing Mail window. To open it, choose the **Show Outgoing Mail** command from Mail Admin's **Server** menu bar item.

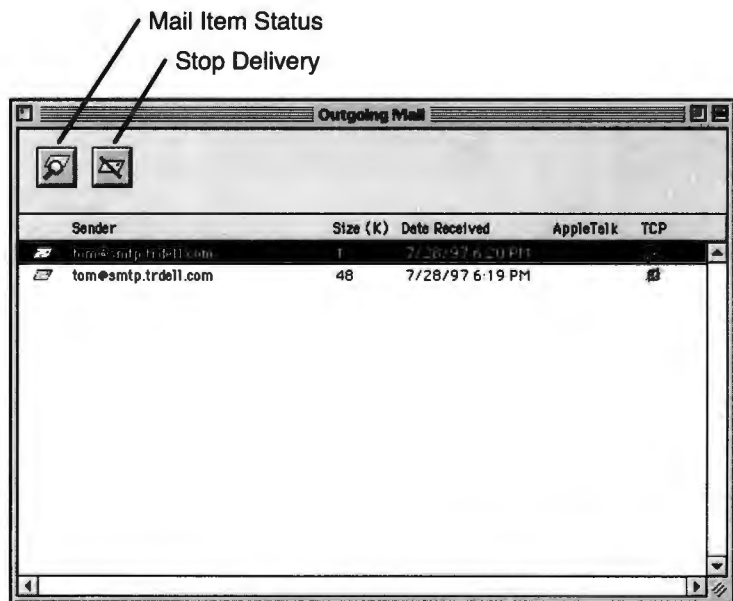


FIGURE 6-28: The Outgoing Mail window.

Here you can view information for each outbound message: the name of the sender, the size of the message, the date and time that the Mail Server received the message, and the protocol over which it is being sent (AppleTalk or TCP).

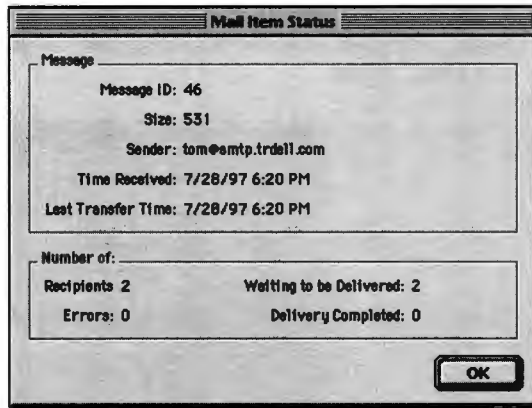


FIGURE 6–29: Viewing the Mail Item Status window.

To view information about an individual message, select the message and press the **Mail Item Status** button. The Message field of the Mail Item Status window displays the message's ID, size, sender, time sent, and the last time the Mail Server tried to send it. Under **Number of** is delivery information such as:

- **Recipients.** The number of recipients to whom the Mail Server is responsible for delivery, as opposed to other recipients who might be listed in the original message but for whom another mail server is responsible.
- **Errors.** The number of recipients to whom the Mail Server has not been able to deliver the message.
- **Waiting to be Delivered.** The number of recipients to whom the Mail Server is attempting to deliver the message.
- **Delivery Completed.** The number of recipients to whom the Mail Server has delivered the message.

For email destined for multiple domains, the Mail Server employs a round-robin scheme to ensure that each domain receives equal attention. For example, after three minutes of attempting to connect to “theirsite.com,” the Mail Server begins trying to connect to “thatsite.com.” After the Mail Server has been exchanging email with “thatsite.com” for 30 minutes and there is still email present that is destined for “theirsite.com,” the Mail Server will disconnect from “thatsite.com” and try “theirsite.com” again.

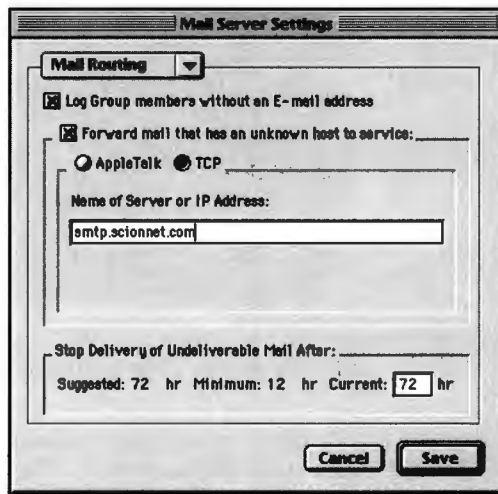
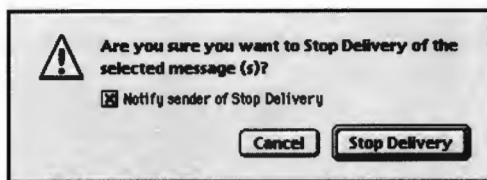


FIGURE 6–30: Establishing the time when email is considered “undeliverable.”

The Mail Server tries to deliver a message for 72 hours, by default. This value can be changed in the Mail Server Settings dialog box under the **Mail Routing** pop-up menu. The minimum value of the Current field is 24 hours, and the maximum value is 336 hours (two weeks).

If you know that one of the messages you see in the Outgoing Mail window is undeliverable, select it and press the **Stop Delivery** button. This will open a dialog box in which you can inform the sender that the message did not go through by enabling the **Notify sender of Stop Delivery** checkbox.



When you press the **Stop Delivery** button, the Mail Server will stop trying to send the message and will remove it from the window. The sender will get a message similar to this one:

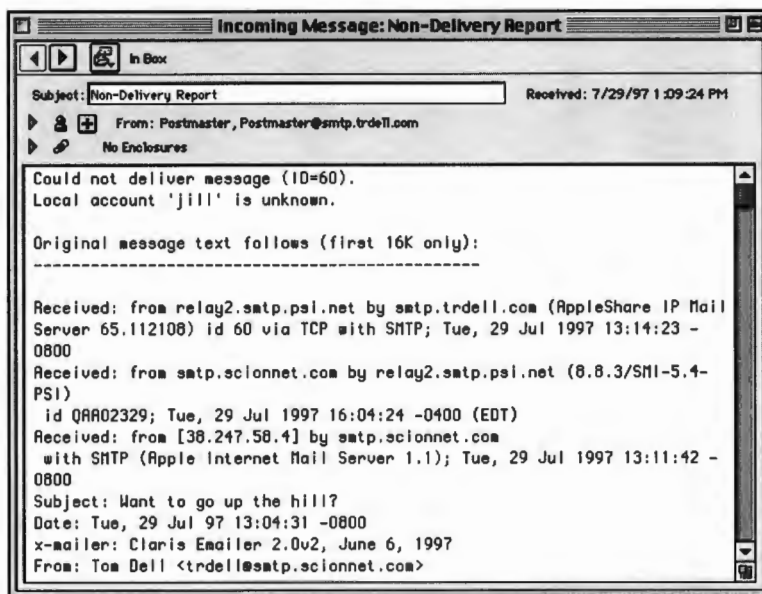


FIGURE 6-31: Notification that email was undeliverable.

## Working with Mail Server Logs

The Mail Server maintains a log of normal operating events and an error log containing information about operational problems. The default size



of these logs is 128 Kbytes, but you can change that in the Mail Server Settings window under the **Mail Logs** pop-up menu.

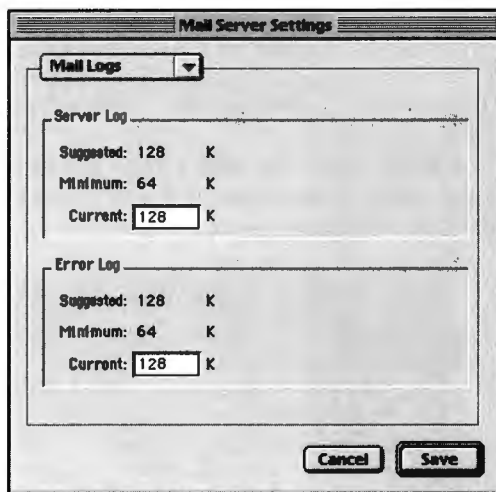


FIGURE 6-32: Setting the Size of the Server Log and Error Log.

The Current field displays the maximum size of the log, which is the largest size to which the log can grow before the Mail Server begins removing its oldest entries to make room for new ones. The minimum size of each log is 64 Kbytes.

To view the Server Log and Error Log, select the **Show Mail Server Log** and **Show Mail Error Log** commands from Mail Admin's **Server** menu bar item.

## Viewing the Server Log

The Mail Server Log window contains buttons for saving, printing, and clearing the log's entries. These entries include:

- When the Mail Server was stopped or started.

- The location of the Mail Database.
- When successful POP connections and failed attempts occurred. The latter are identified as being caused by one of the following factors:

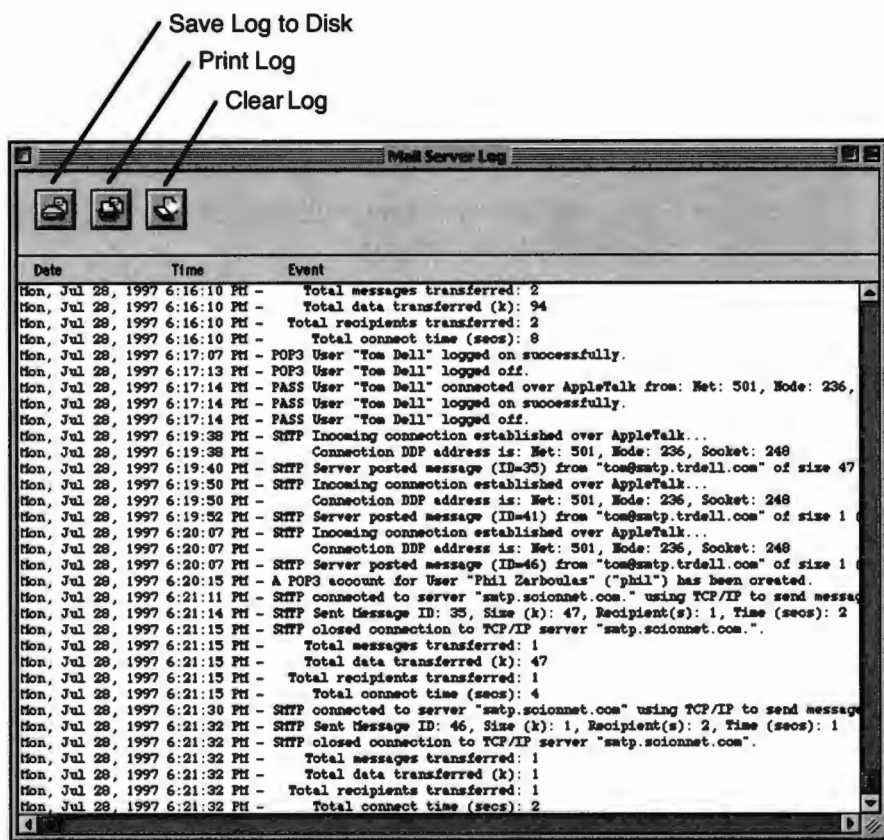


FIGURE 6-33: Viewing the Mail Server Log window.

1. An incorrect password was supplied.
2. An encrypted (APOP) password was required but not supplied.
3. Email access is not enabled for the recipient.
4. APOP authentication failed.

5. An unknown user name was supplied.
  6. The user is already connected.
- When users change their passwords. You are also told when a user was allowed to connect with an expired password was allowed to connect even though his or her password needs to be changed.
  - When successful SMTP connections and failed attempts occurred.
  - Messages that the Mail Server is no longer attempting to deliver.
  - The creation and deletion of mail accounts in the Mail Database.
  - When the server's AppleTalk was turned on and off and when its AppleTalk zone changed.
  - When the server's TCP/IP was turned on and off and when changes were made to its hostname name or IP address.
  - When the log was cleared.
  - When messages were forwarded because they were intended for an "unknown host" (e.g., via a relay mail host).

## Viewing the Error Log

The Error Log window also contains buttons for saving, printing, and clearing the log's entries. Its entries include:

- When the Mail Server failed to start, for one of the following reasons:
  1. There is incompatible software present, such as old versions of the system or Open Transport.
  2. The Mail Database's volume could not be found.
  3. The Mail Database could not be created because there was not enough free space on its volume.
  4. Another service is using the SMTP TCP/IP port, SMTP AppleTalk port, or POP TCP/IP port.
  5. There is insufficient free memory.

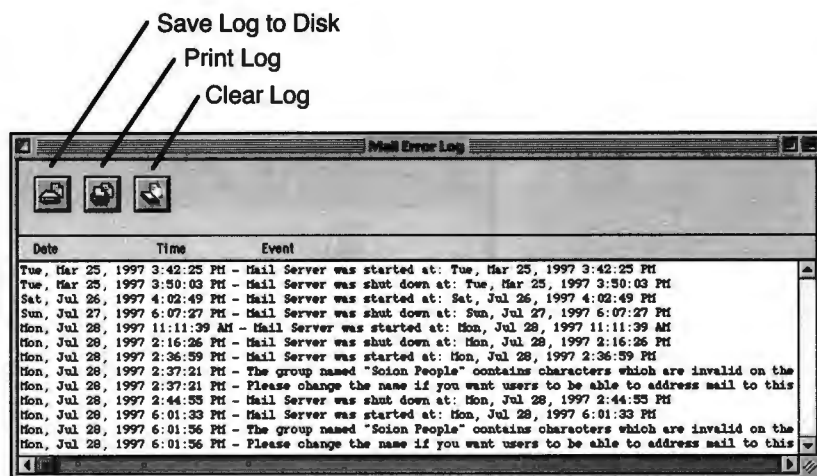


FIGURE 6-34: Viewing the Error Log window.

- When the Mail Server failed to deliver email because email access was not enabled for a user.
- When the Mail Server refused incoming email because the free disk space threshold was reached.
- When email addressed to a group name contains invalid characters.
- When the Mail Server sent a "non-delivery report" to a user indicating that the user's email could not be delivered.

You should review these logs periodically to identify recurring problems.

## Backing up the Mail Database

The AppleShare IP Mail Database, stored by default in the AppleShare IP Mail Folder at the root level of the Startup Disk, is as important to the Mail Server as the Users & Groups Data File is to AppleShare IP overall. It contains all incoming and outgoing email that has not yet been read or

delivered. Take great pains to ensure that both the Users & Groups Data File and the Mail Database get backed up regularly.



---

FIGURE 6-35: Locating the Mail Database.

Before you back up the Mail Database, stop the Mail Server. This prevents the database from changing during the backup process, thereby ensuring its internal consistency. You can do this manually, with an AppleScript or some other scripting utility. (Refer to this book's accompanying CD-ROM for an example.)

## ANOTHER EMAIL SERVICE: LISTSTAR

A useful addition to your organization's network services is StarNine's ListSTAR. This application is a Mac OS-based list server that supports email-based discussions by enabling a user to send a message to the server which is then forwarded to all members of a given mailing list. Users can subscribe to the service automatically by submitting an email message containing a keyword, such as "subscribe" in the Subject field. Thanks to the wonders of Internet email, these mailing lists can be composed of users from all over the globe.

ListSTAR can also function as an Email-On-Demand (EOD) system. Just as a fax-back system responds to a telephone call, ListSTAR responds automatically with email whenever a user requests information.

To perform these functions, ListSTAR allows you to configure a number of different *services*. Among other things, it can help to reduce your user support burden while improving the level of service. I will show you how to do that here.

## Configuring ListSTAR

ListSTAR's installer creates a folder on the Startup Disk that contains the server application and several subfolders. The "ADMIN" folder contains preferences, email account information, logs, and other administrative software. The "Message Spool" folder contains incoming and outgoing messages. The "Services" folder contains preferences for every service you establish, as well as any email enclosures that those services are meant to distribute. The "AppleScripts" folder contains scripts that automate ListSTAR's functions. The other folders contain samples and documentation.



FIGURE 6-36: Viewing the contents of the ListSTAR folder.

Once you have taken the time to configure ListSTAR, the loss of any one of these folders would be keenly felt. Back up the ListSTAR folder after you have finished the configuration, and regularly thereafter.

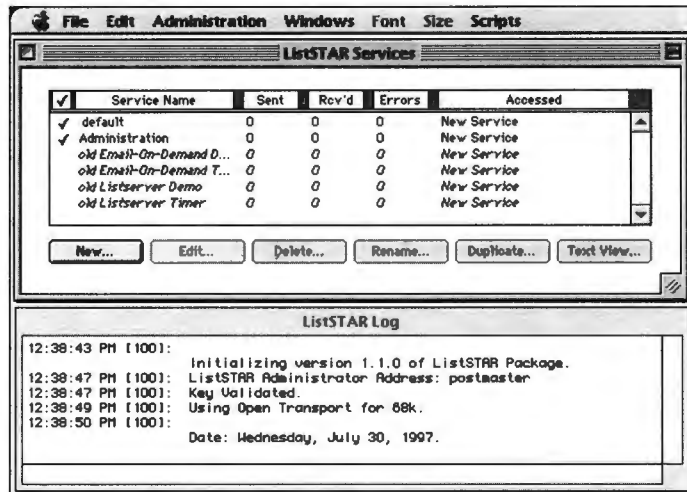


FIGURE 6-37: The ListSTAR Services and ListSTAR Log windows.

When you first launch ListSTAR, you are presented with the ListSTAR Services window and the ListSTAR Log window. Ignore these for now. We must first set ListSTAR's preferences.

## Configure General Preferences

Select the **General Preferences** command under the **Windows** menu bar item to open the ListSTAR Preferences window. The **General** category contains instructions for how much time ListSTAR will spend attempting to deliver queued mail, how many details it will record in its logs, and whether or not it will run in a "threaded" environment.

There is little need to change the settings in the Outgoing Mail Queuing field. Email might not go through initially because the destination mail host is down or busy. However, if you know a regularly used mail host is unavailable for periods longer than those set in the defaults, you may want to change them.

What you choose in the Logging Level pop-up menu determines how much information ListSTAR will record about each session. The default

**Message Logging** is usually sufficient, but selecting higher levels will provide you, or StarNine Tech Support, with more valuable troubleshooting information.

Below the Logging Level pop-up menu is the Threads field. The **Enable Thread Support** checkbox should be selected. When running under System 7.5 and newer (and earlier System 7.x with the Thread Manager extension installed), ListSTAR can open a number of simultaneous connections. Without Thread Manager support, ListSTAR can open more than one connection simultaneously but can move email over them only one at a time.

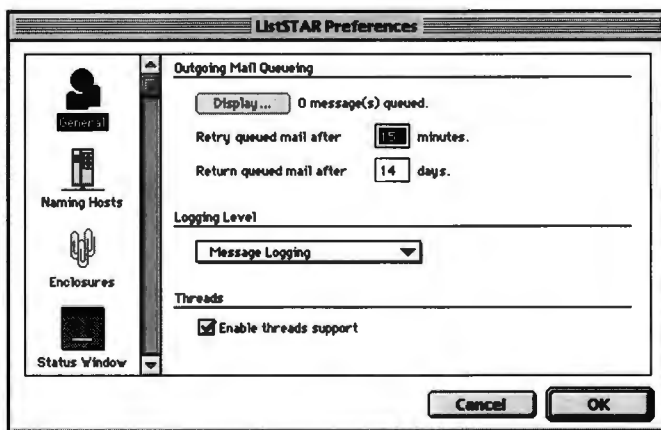
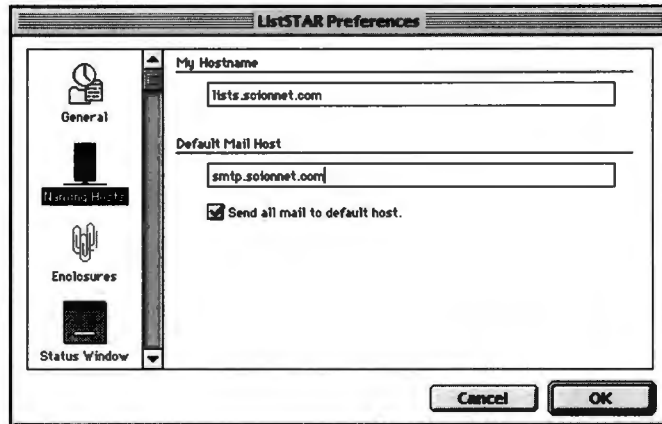


FIGURE 6-38: Setting general preferences.

## Configure Naming Host Preferences

Select the **Naming Hosts** category in the ListSTAR Preferences window. Type the list server's domain name in the **My Hostname** field (e.g., "lists.yoursite.com"). See Chapter 11 for information on establishing Domain name-to-IP address mappings.





---

FIGURE 6-39: Setting up hostname preferences.

Next, in the **Default Mail Host** field enter the hostname of a mail host, presumably your AppleShare IP Mail Server, to forward email to for delivery (e.g., "smtp.yoursite.com").

There are two TCP/IP-based flavors of ListSTAR. ListSTAR/SMTP operates as its own stand-alone mail host and can deliver its email directly, but you may off-load the work to the default mail host by selecting the **Send all mail to default host** checkbox. ListSTAR/POP can be configured with the same services that ListSTAR/SMTP provides, but it *requires* that another mail host forward its messages.



---

*Note: It is unwise to run ListSTAR/SMTP on the same machine that is running the AppleShare IP Mail Server, because both servers listen for incoming messages on TCP Port 25. You may safely run ListSTAR/POP on the same computer that is running AppleShare IP Mail Server.*

---

## Configure Enclosures Preferences

Select the **Enclosures** category in the ListSTAR Preferences window. In addition to plain-text email, ListSTAR can send out file enclosures. To pass these enclosures through various other email systems, however, it must translate them into a binary format. It is an Internet convention to encode file enclosures in one of several widely accepted formats.

What you choose in the File Translations pop-up menu determines how ListSTAR will deal with straight text file enclosures in outgoing mail. The default of **Append TEXT files to Mail** directs ListSTAR to add the contents of the enclosure to the body of the email message itself.

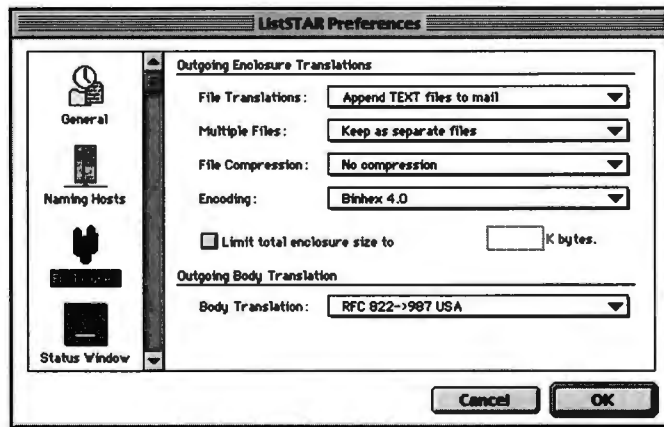


FIGURE 6-40: Setting enclosure preferences.

The default **Keep as separate files** in the Multiple Files pop-up menu ensures that ListSTAR will not pack different file enclosures together. Imagine that you have one text file and one application (binary) file that you wish to send to a mailing list. Under this preference, ListSTAR handles the text file based on the criteria established in the File Translations pop-up menu, and the binary file using criteria established under the Encoding pop-up menu. In this case, two enclosures leave the list server.

If you know that ListSTAR is distributing files to Macintosh users only, perhaps because it is on an intranet, you may save users some transfer

time by enabling **StuffIt** compression in the File Compression pop-up menu.

Of the many options in the Encoding pop-up menu, there are only three that most administrators will need to think about.

1. The default choice is **Binhex 4.0**, which is used to turn binary data into ASCII text and back again. This method works best when you have Mac OS file enclosures that you know are going to other Mac OS users.
2. Choosing **Data fork Only** will direct ListSTAR to apply the UNIX standard UUencode algorithm on the data fork of a Mac OS file and discard the resource fork. If the ultimate destinations of these enclosures will be other Mac OS users, this deprives them of resource information needed by the Mac OS, but if the ultimate destinations will be users of older PCs or UNIX machines, **Data fork Only** is the best choice.
3. If you choose **AppleSingle**, ListSTAR translates the Mac OS file into a file format that permits both its data and resource forks to be recreated on the receiving system; then it encodes this resulting file using the UNIX-standard UUencode format.

Refer to the *ListSTAR Administrator's Guide* for complete information.

If necessary, you may limit the size of outgoing messages by setting the **Limit total enclosure size to option**. This fail-safe ensures that your list server is not overwhelmed by large files.

You may determine how the Macintosh's 8-bit characters will be translated for systems using 7-bit character sets in the Body Translation pop-up menu. I suggest that you stick with the default **RFC 822->987 USA** option because it works even on the oldest email systems.

These settings affect all email leaving ListSTAR.

## Configure Status Window Preferences

Select the **Status Window** category in the ListSTAR Preferences window. Enabling the **Display ADMIN Status Window** checkbox displays a useful monitor of ListSTAR's activity. The numbers you set in the **Count**

mail messages every field determine how much time ListSTAR will spend counting messages. Every 15 minutes is usually often enough unless you are troubleshooting.

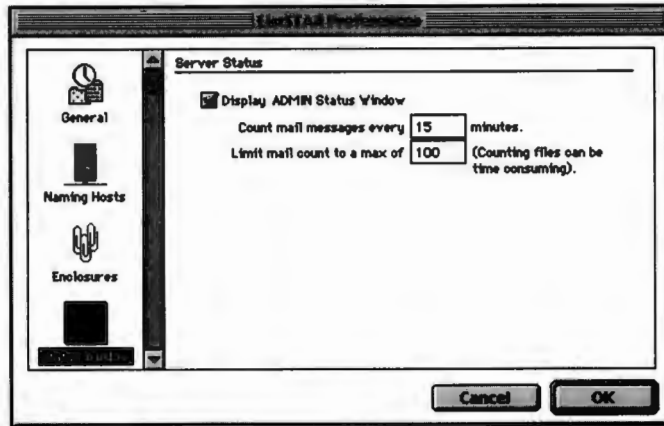


FIGURE 6-41: Setting Status window preferences.

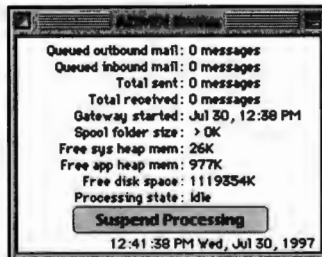


FIGURE 6-42: The ListSTAR Status window.

ListSTAR will stop counting messages after it reaches the number you specify in the **Limit mail count to a max of** field. Make this number smaller than 100 to limit the load on the processor.

## Configure SMTP/TCP Preferences

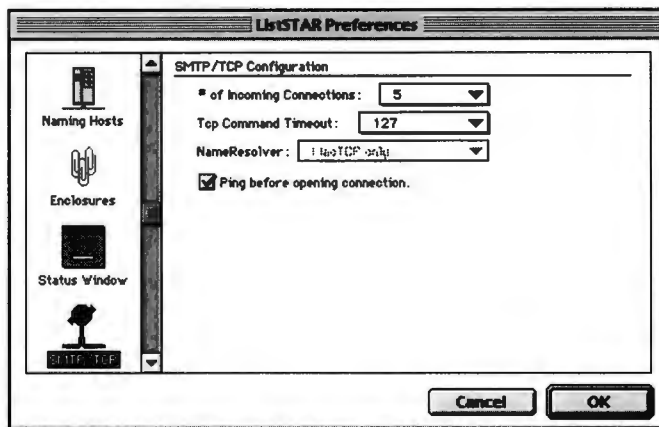


FIGURE 6-43: Setting SMTP/TCP preferences.

Select the **SMTP/TCP** category in the ListSTAR Preferences window. Here you can modify how ListSTAR will work with TCP/IP and the threaded environment mentioned earlier.

With the default of 5 in the **# of Incoming Connections** pop-up menu, you get a total of 11 concurrent processes, or *threads*. Five of these listen for incoming email, four send email, one is the *main* thread, and one more can also act as a sender.

The screenshot shows the 'Threads' window with a table of thread statistics:

Type	Calls	Ticks	Avg	%
Idle	17475	111341	6	67%
• Main	41806	48521	1	29%
Ctrl	14	111	7	0%
Actl	26	2153	82	1%
◊ Recv	606	120	0	0%
◊ Recv	0	0	0	0%
◊ Recv	0	0	0	0%
◊ Recv	0	0	0	0%
◊ Recv	0	0	0	0%
◊ Biff	4	0	0	0%
Send	23467	2408	0	1%

FIGURE 6-44: The ListSTAR Threads window.

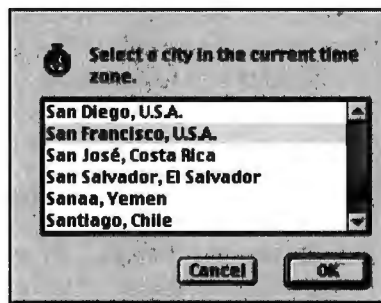
The **TCP Command Timeout** pop-up menu controls how long ListSTAR will wait for a response from a mail host before assuming it is unavailable. The default is 127 seconds, but you might have better luck with 255.

If you are running ListSTAR on a non-Open Transport computer, the **NameResolver** pop-up menu will have some relevance. It determines whether or not ListSTAR will call on MacTCP or on its own built-in resolver to query DNS. I recommend that you use Open Transport, however, in which case this menu will be grayed out.

If you select the **Ping before opening connection** checkbox, ListSTAR will try to make sure that a remote host is available before attempting to communicate with it. Disable this if you are running ListSTAR/POP alongside AppleShare IP Mail Server.

## Configure Date and Time

To ensure that ListSTAR generates the correct time in its email headers, you must tell it what time zone it is in relative to Greenwich Mean Time (GMT). You can do this by pressing the **Set Time Zone** button in the Date & Time control panel, and then choosing the city nearest you in the list that appears.



## Establishing Administrative Services

ListSTAR's services are composed of individual email accounts that are associated with a set of rules. These rules control how messages sent to the email accounts will be handled.

Services are defined as one of two types: SMTP or Timer. SMTP services, such as list services and EOD, react to keyword-coded email (e.g., “When an email comes in that says *this*, do *that*”). Timer services, such as list server digest distribution and log forwarding, react to schedules (e.g., “When it is *that* time, do *this*”).

An SMTP service must both send and receive email, so it requires its own email account. A Timer service need only send email, so it does not require its own email account.

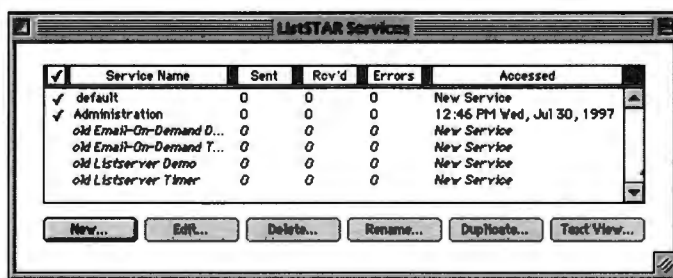


FIGURE 6-45: Services available in the ListSTAR Services window.

When ListSTAR is first launched, several administrative services are made active. These are listed in plain text in the ListSTAR Services window. In addition, several demonstration services are available but inactive. These are listed in italics. The services that are active are Timer and SMTP services, set up to automate ListSTAR’s administrative functions.

## Modify the Default Service

The “default service” handles all email not addressed to any other service. To configure it, double-click on its line item. In the Service Preferences window that appears you will see icons for both the service’s email account information and the associated rules.

In the Account window, edit the Email Address field to reflect your site (e.g., “MAILER-DAEMON@lists.yoursite.com”).

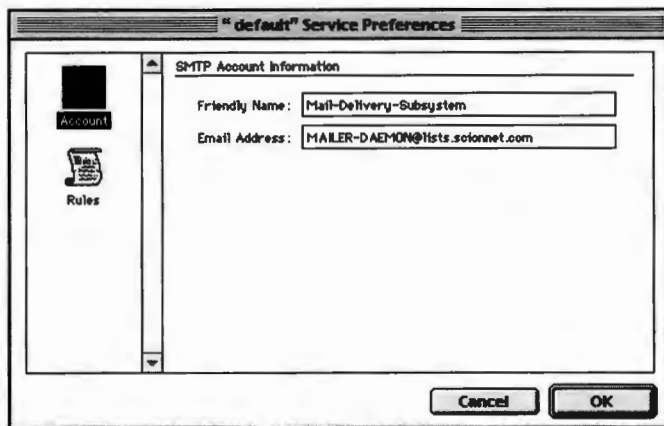


FIGURE 6-46: Setting default service account preferences.

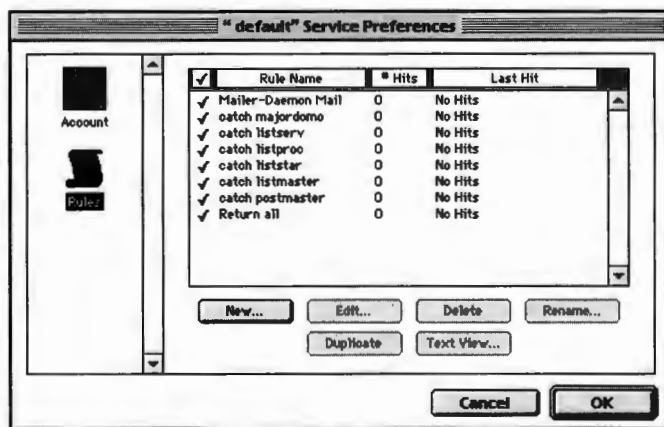


FIGURE 6-47: Setting default service rules preferences.

In the Rules window you can determine how ListSTAR will handle mis-addressed email. To get an idea of how this works, double-click on the "Return all" list item to examine its criteria.



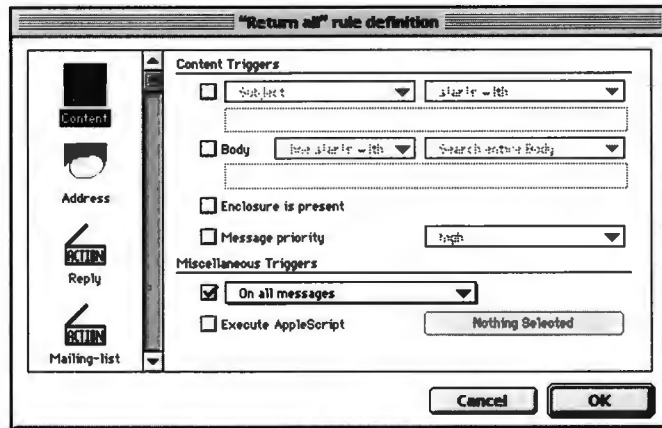


FIGURE 6-48: Examining default service content triggers.

Rules are basically “if-then” instructions: *If you see a red light, then stop at the intersection* (a logic that is foreign to many of my fellow San Franciscans). In the default service, the settings in the Content and Reply windows work together to complete the if-then statement. For example, *If you get a message, then:*

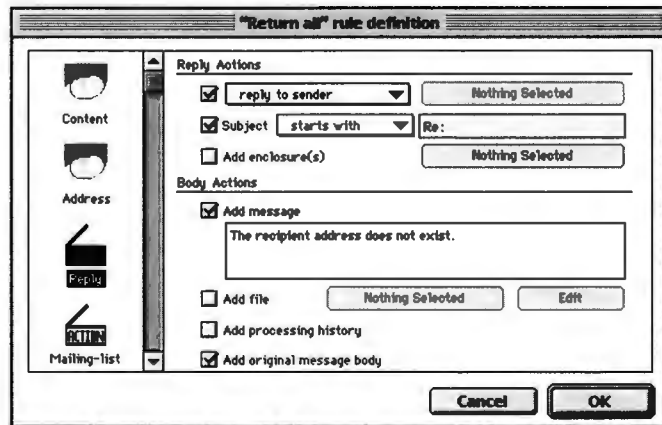


FIGURE 6-49: Examining default service reply and body actions.

1. Reply to the sender by appending the subject with "Re:" and . . .
2. add the message "The recipient address does not exist" and . . .
3. add the original message body to this reply.

The instructions go on in the Miscellaneous window to say: When you have done that, stop processing the email and record your actions in the "ListSTAR log" by saying "Mail to unknown service returned."

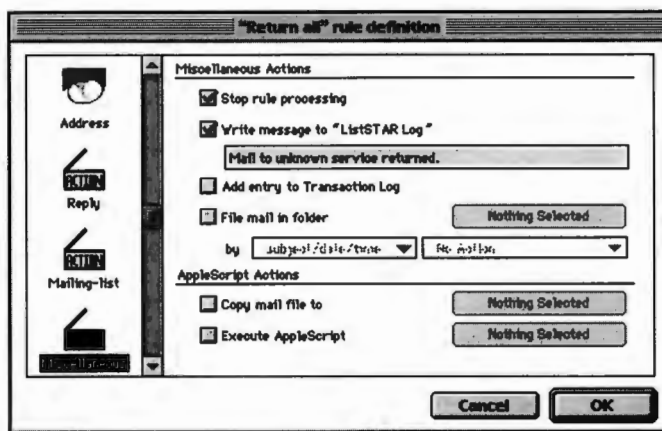
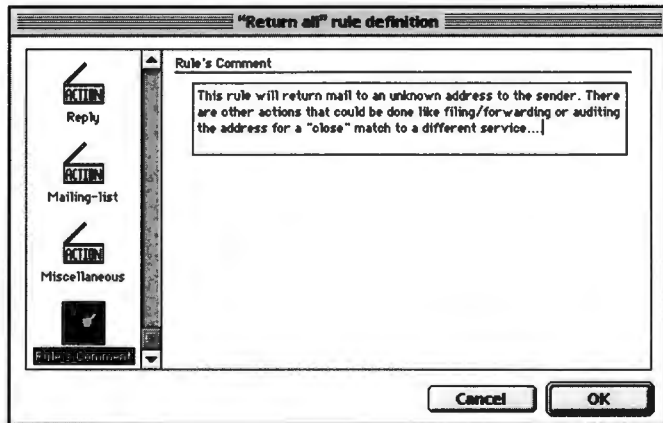


FIGURE 6-50: Examining default service miscellaneous actions.

This is the basic model of how all services work. To see or enter a summary of a service's functions, select the Rule's Comment window.



---

FIGURE 6-51: Examining default service rule's comment.



---

*Note: If you change the name of this service, be sure to include a blank space before the new name. It needs to be at the top of the ListSTAR Service window to execute at the right time.*

---

## Modify the Administration Service

The “Administration” service does not handle incoming email and so does not require its own email account. Its job is to file ListSTAR’s various log files within the subfolders of the “Administration” folder that is in ListSTAR’s “Services” folder.

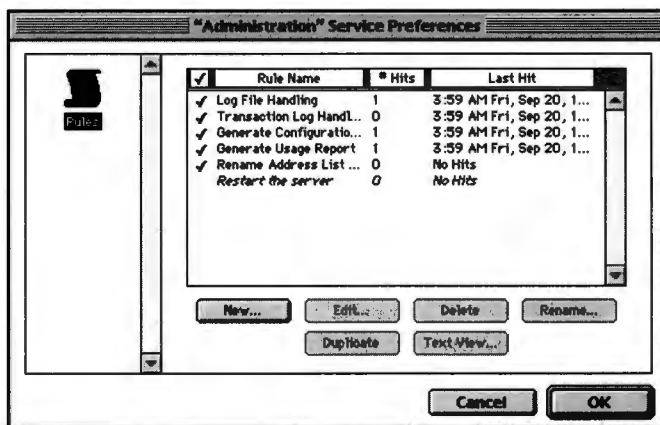


FIGURE 6-52: Examining rules in the Administration Services window.

You may change the folder to which logs are saved or have the service forward some or all of the logs to your email account here.

It is beyond the scope of this book to illustrate every possible ListSTAR configuration. However, I will show you a configuration that can help you greatly in supporting your end users, the topic of Chapter 8.

## Establishing Email-On-Demand

To familiarize you with ListSTAR further, let's set up a new service. This requires little effort because StarNine thoughtfully created several scripted templates that need only minor modification to reflect your exact needs.

Let's use this initial service to answer common user questions. We will name it "Tech Support EOD." This new service will:

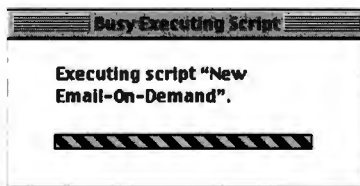
1. Collect email under the account name of "FAQ" (for "Frequently Asked Questions").

2. Accept messages addressed to "FAQ@lists.yoursite.com" which contain the word "index" in the Subject field and respond with a message form that contains an index of available topics.
3. Enclose the requested files and reply, based on the selections made in the form and returned by the user.
4. Update the index daily.
5. Collect the email addresses of users who have asked for information.
6. Log all transactions.

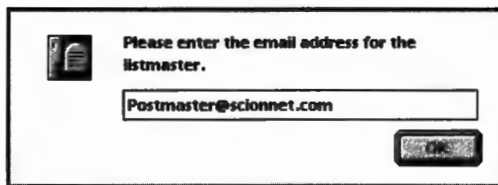
Here is how you go about it.



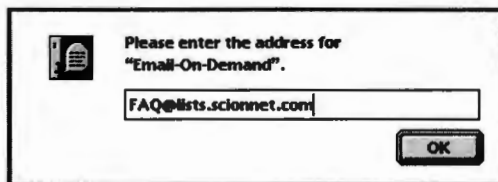
To begin, select the **New Email-On-Demand** command from ListSTAR's **Scripts** menu bar item. This will direct ListSTAR to create all the files necessary for a new service from its templates and to ask you for basic information.



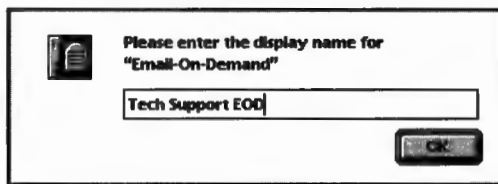
The script will first ask you to submit an address for the list server's administrator, or "listmaster." This can be your own email address or, better yet, the Internet alias for AppleShare IP's Mail Administrator account (e.g., "Postmaster@yoursite.com").



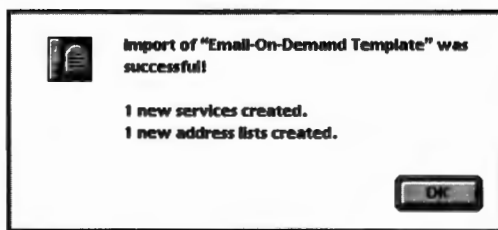
Next, you must tell the script what name it should use for the service's email account.



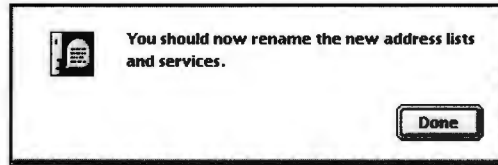
That done, the script will ask you to name the new service.



The script will then continue the installation process and inform you when it has finished.



As you dismiss the script, it will inform you that there is still some work left to do.



The first task is to rename the new service as it appears in the ListSTAR Services window. Select it from the list and press the **Rename** button; then change the name from the generic “Email-On-Demand” to “Tech Support EOD.”

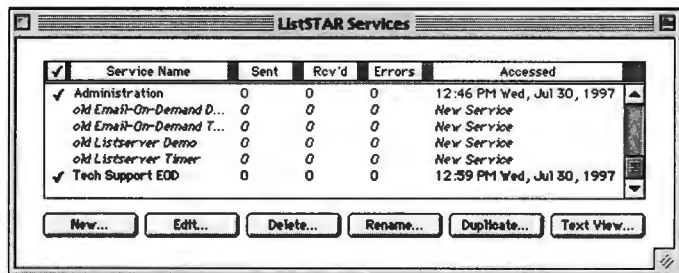


FIGURE 6-53: Renaming the newly created service.

Open the new service to view the Rules window in Service Preferences. Here you may modify StarNine’s demonstration settings.

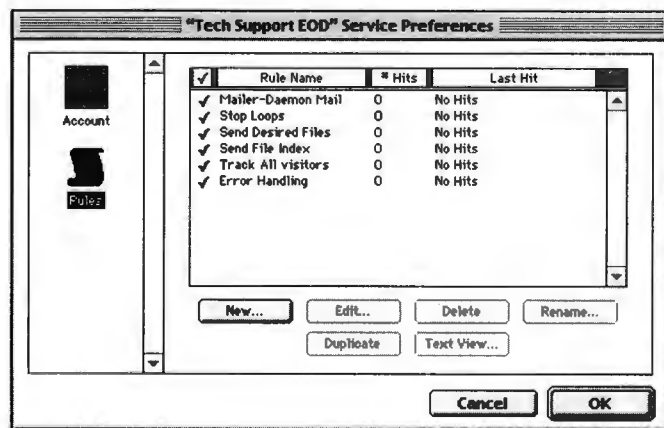
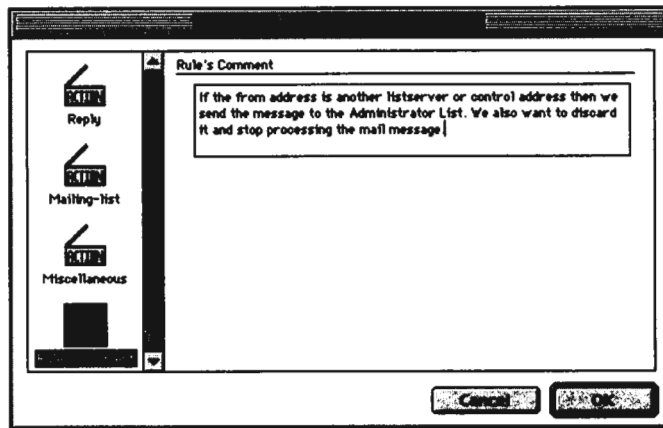


FIGURE 6-54: Modifying the service’s rules.

## Mailer-Daemon Mail

These rules are executed in the order in which they are listed here. The first rule, “Mailer-Daemon Mail,” handles any email from reserved addresses such as “mailer-daemon.” Email from such sources comes in when ListSTAR sends email to an address that is invalid or unavailable.

You do not need to modify this rule. StarNine describes its purpose as illustrated:



---

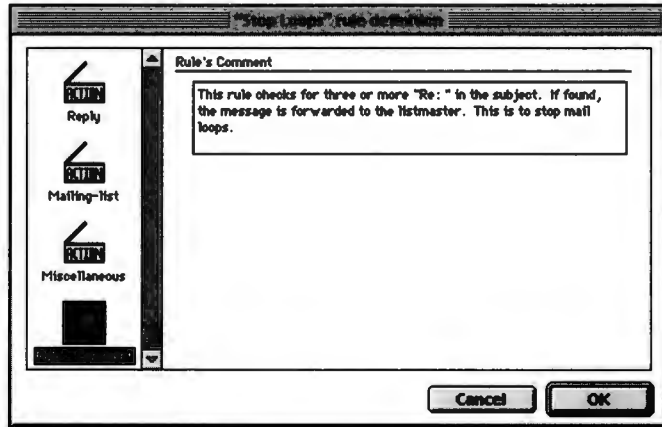
FIGURE 6-55: Purpose of the “Mailer-Daemon Mail” rule.

This vital function should be part of every service you create. This email will be forwarded to the list server administrator’s address, which you entered earlier.

## Stop Loops

Under rare circumstances, a list server may automatically respond to an email query, which bounces back causing the list server to respond again ad infinitum. The Stop Loop rule ensures that this will not happen by redirecting any incoming messages that begin with “Re:” (Reply). StarNine describes its purpose as illustrated:





---

FIGURE 6-56: Purpose of the "Stop Loops" rule.

This too is a vital function that should be part of every service you create.

## Send File Index

The first rule you may modify is the third in the list: "Send File Index." This rule involves the use of ListSTAR's *auto responder*. The auto responder uses AppleScript to generate a selection form in which users can see what files are available on the list server and select the ones they want to have returned to them.

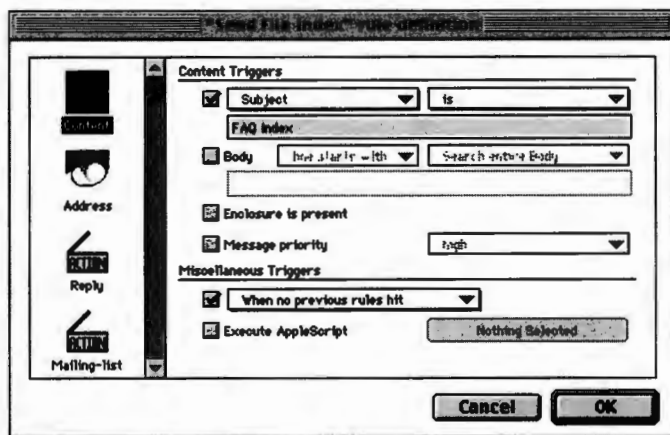


FIGURE 6-57: Modifying the Content window.

In the Content window, modify the rule to accept email that has the key phrase “FAQ Index” in the Subject field.



FIGURE 6-58: Adding to the “Files Available for Retrieval” folder.

ListSTAR puts a “Files Available for Retrieval” folder within the folder it made automatically when you created the service (e.g., the “Tech Support EOD” folder within the Services folder). Here is your repository for the FAQ files that ListSTAR will send to your users. (I have included a bunch of these for you on this book’s accompanying CD-ROM.) Note too that ListSTAR also encloses a file titled “List of Available Files” within the service’s folder. This will be your EOD index.

There are two ways in which the file index can be returned to a user. The first way involves the auto responder and AppleScript, and can be

enabled in the Miscellaneous window. Under this method, ListSTAR creates a list of files in the service's folder on-the-fly and returns it to the user for further instructions.

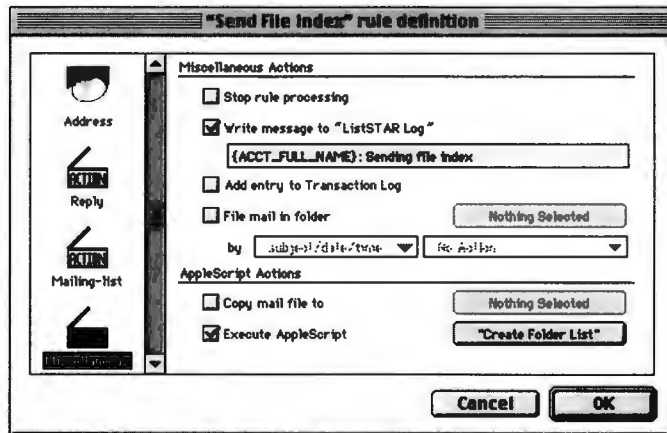


FIGURE 6-59: Using the auto responder to generate a file index.

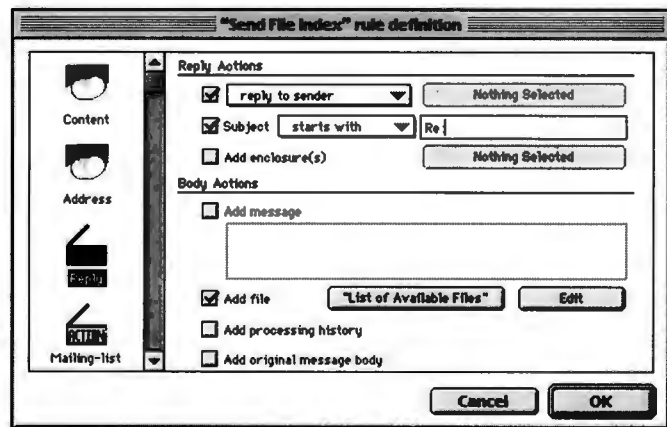


FIGURE 6-60: Modifying the Reply window.

If you prefer to avoid AppleScript, you can configure another method in the Reply window. In this window, direct ListSTAR to reply to the incoming message with the words “Re: FAQ Index” in the Subject field. Then enable the **Add file** checkbox. Press the button next to the **Add file** field to make sure “List of Available Files” is selected. Press the **Edit** button to manually change its contents.

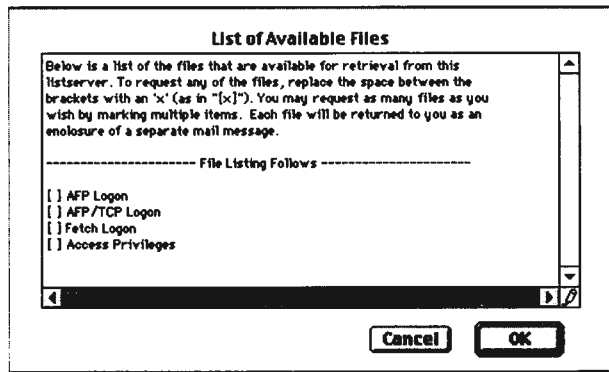


FIGURE 6-61: Modifying the File Index file.

## Send Selected Files

Work with the “Send Desired Files” rule next. In the Content window of this rule you will see a line of control characters.

This is code that ListSTAR understands.

```
\[ *x *] Get file \(.*)
```

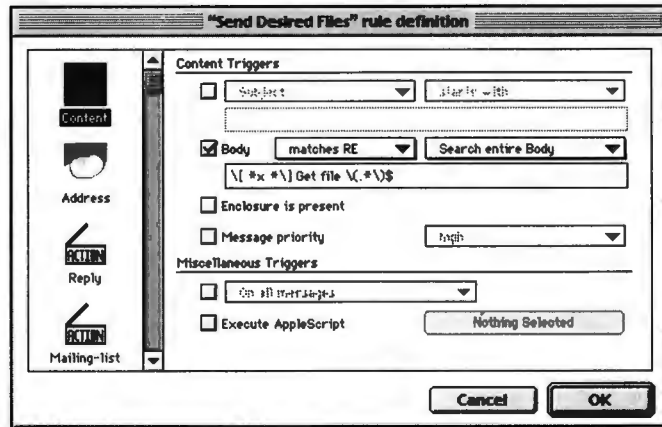


FIGURE 6-62: Viewing the expression for parsing the incoming file request form.

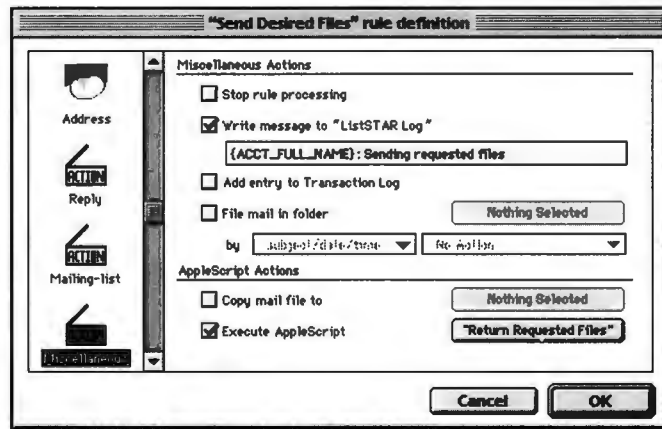


FIGURE 6-63: Selecting the auto responder AppleScript.

When a user has made choices in the file index form and replied with it, his action parses the file, extracts the requested filenames, and uses Apple events to send each file back to the user. Go to the Miscellaneous window to see the AppleScript that Apple events call for. You should see the

“Return Requested Files” script selected by the **Execute AppleScript** checkbox.

## Track All Visitors

The fifth rule is “Track All Visitors.” It will record the email address of every user who requests a document from your EOD service.

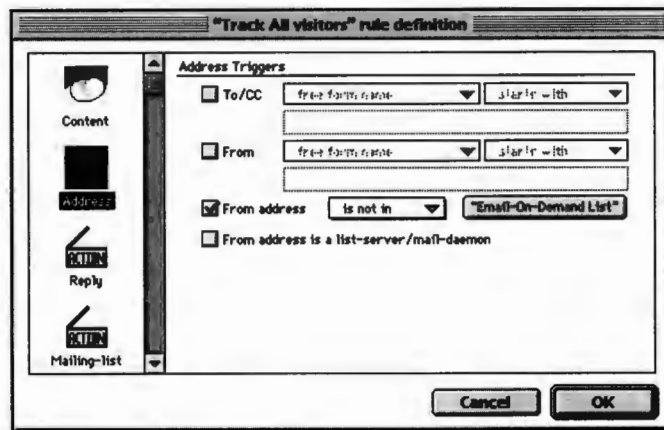


FIGURE 6-64: Creating a mailing list for EOD service users.

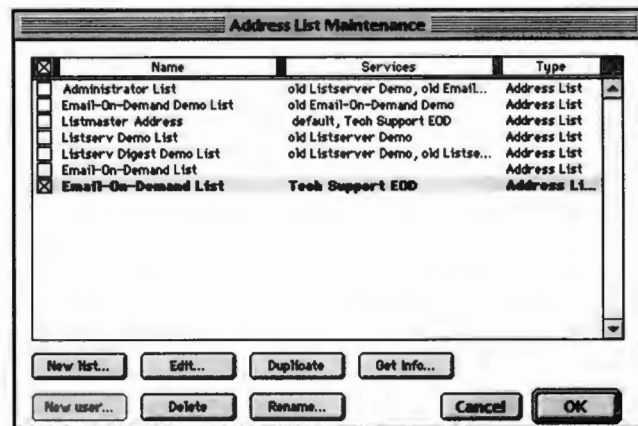


FIGURE 6-65: Selecting the new service mailing list.

You can choose which mailing list the addresses will be added to by pressing the button next to the **From Address** Field. Also go to the Mailing List Action window. Here too you should see the new mailing list in the button by the add "From" address to pop-up menu.

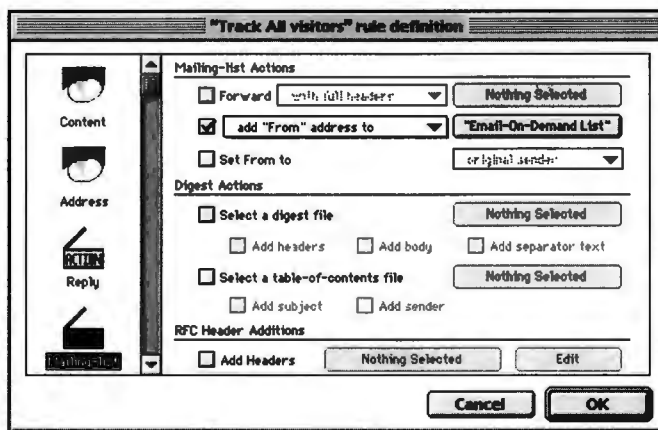


FIGURE 6-66: Selecting the new mailing list as the "From" address.

## Error Handling

The sixth and final rule is "Error Handling," which will notify you when there has been an error in message processing. You do not have to make any changes here.

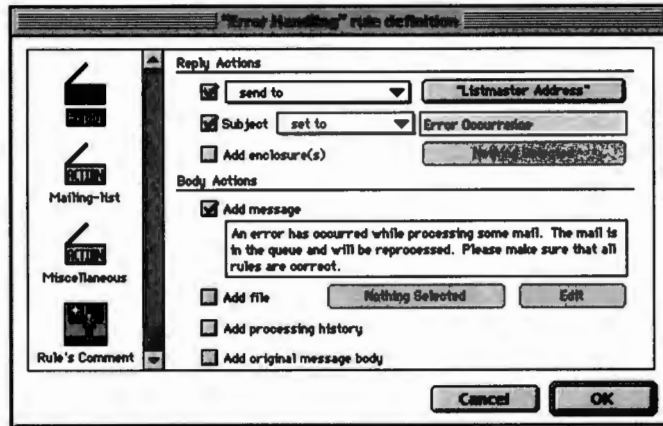


FIGURE 6-67: Establishing error notifications.

Press the **OK** button to return to the ListSTAR Services window. Here, enable the checkbox next to the new service (e.g., “Tech Support EOD”). This completes the steps necessary to use the SMTP service for this EOD system.

There is an additional service that you may wish to set up. Under the current configuration, an AppleScript will be launched to generate a new file index each time one is requested. If your list server gets many hits, this can increase overhead unnecessarily. You might want to have the file index generated once daily instead. To do this you need to create a Timer service.

## Using an EOD Timer

To begin, press the **New** button in the ListSTAR Services window to create a new service. Name it “Tech Support EOD Timer,” and be sure to select **Timer** in the Type pop-up menu.



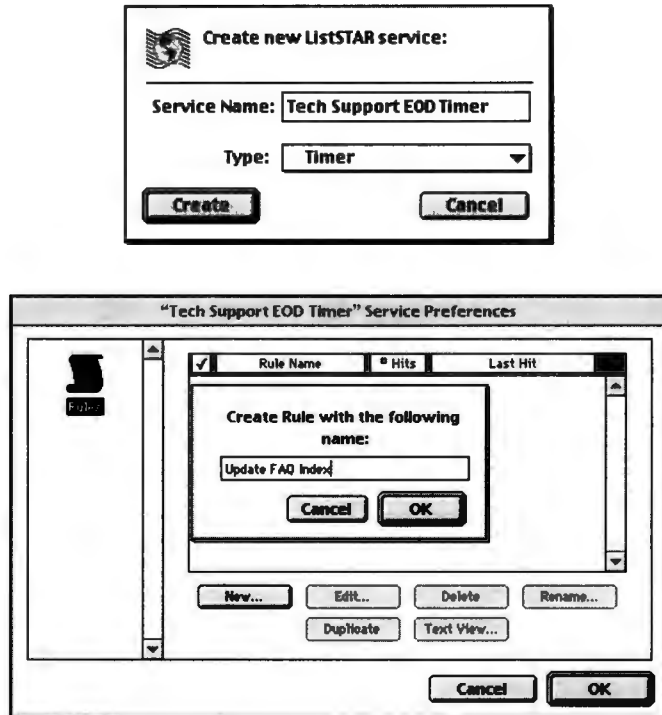


FIGURE 6-68: Renaming the update rule.

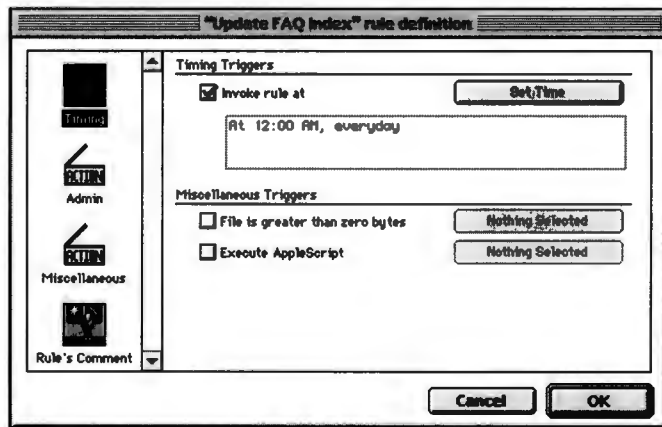


FIGURE 6-69: Setting the update timing.

This service needs only one rule. Press the **New** button in the Services Preferences window to create it, naming it “Update FAQ Index.” In the Timing Triggers window, enable the **Invoke rule at** checkbox, and use the **Set Time** button to execute this function daily. Choose a time when the server is least busy and when it will not conflict with another service, such as a backup or database synchronization.

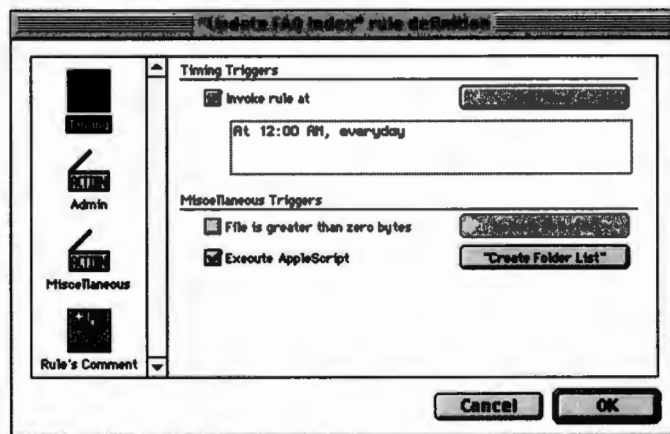
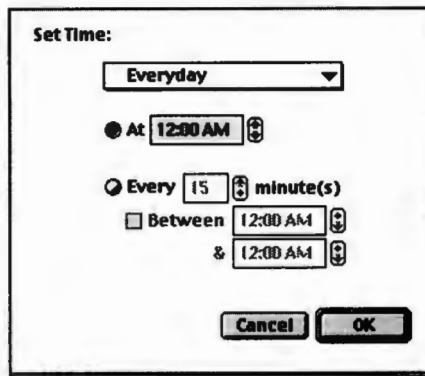


FIGURE 6-70: Enabling the “Create Folder List” AppleScript.

In the Miscellaneous window, enable the **Execute AppleScript** checkbox and use the button to choose the “Create Folder List” script. This script will update the “FAQ Index” whenever additional files have been added to the Files Available for Retrieval folder. You will then have a system that should relieve some of your user support burden. Be sure to test it

from several different email accounts before you start advertising its availability, however. There will probably be some minor tweaking required.

This short section cannot replace StarNine's *ListSTAR Administrator's Guide* for detail. However, I hope that it has made you familiar enough with ListSTAR's workings that further reading will be easier.

## SUMMARY

AppleShare IP Mail Server is an SMTP- and POP3-compliant email server capable of exchanging email with both Mac OS and non-Mac OS-based computers on a LAN or the Internet. It is also capable of communicating with Mac OS computers over AppleTalk.

The Mail Server relies on two important files. The first is AppleShare IP's Users & Groups Data File, in which the program stores information such as users' account names, Internet aliases, and whether or not users' accounts are enabled to use email services. The second is the Mail Database, in which all incoming and outgoing email is stored. Both should be backed up regularly, when the Mail Server is *not* running.

In addition to AppleShare IP's Mail Server, another useful email service is made available by a list server such as StarNine's ListSTAR. With it you can host email discussion groups and provide email on demand.



# AppleShare IP Print Server

Many LANs owe their existence to printing because, once upon a time, laser printers were expensive. In order to make one cost-effective, it was necessary to share it among multiple users. AppleTalk made this possible.

The first Apple printer that could be shared on a LocalTalk network was the ImageWriter. This dot matrix printer used QuickDraw, the same technology that Apple employed to draw images on the screen. The screen resolution of a Macintosh was 72 dots per inch (dpi), as was the resolution of the ImageWriter. Not much to look at, but it was enough to spark the desktop publishing revolution!

In 1984, the Macintosh was the first computer to ship with multiple fonts. These were bitmapped fonts, designed to be displayed on a

screen in pixels, and as such they appeared jagged when printed. In 1985, the situation changed greatly when John Warnock and Chuck Geshke of Adobe Systems created a computer language just for printers. The *PostScript* page description language made it possible to use a printer, equipped with its own processor, to mathematically translate the square pixels of a monitor into the round dots necessary for high-resolution printing. This process is called *rasterizing*.

Laser printers quickly took over the market, which had been dominated by dot matrix and typewriter-like daisy wheel printers. The PostScript-based Apple LaserWriter was one of the first. It became a standard piece of equipment in many offices, spawning many LocalTalk networks. Today it would be unusual to find an office that does not have one or more networked laser printers.

Hewlett-Packard had created another system, *Printer Control Language (PCL)*, but this was never supported on the Macintosh. HP entered the Mac OS marketplace when it started making dual-language printers that could switch to either PCL or PostScript with each print job. (Luis Cubero, a Hewlett-Packard engineer, once told me his company's reasoning behind introducing the laser printer in the first place: Daisy wheel and dot matrix printers were too noisy! HP speculated that if they built a printer based around a nice quiet copier engine, there might be a small market for them in the workplace. Obviously, there was more than a small market. HP has shipped more than 20 million LaserJets to date.)

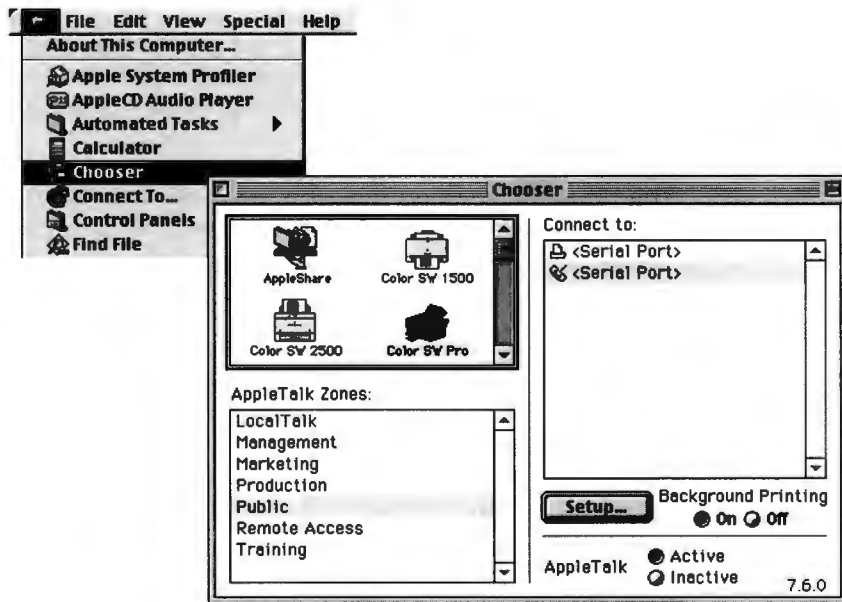
In the future, we can look forward to a reversal of sorts. Instead of using a screen-draw technology in a printer (QuickDraw), Apple will be using a printer language to draw the screen (PostScript).

There are several ways to print from a Mac OS computer. You can print locally from the workstation to an attached printer through the Printer (LocalTalk) port using a serial cable. You can print remotely over the network to a printer connected to, and shared from, another workstation. You can print remotely to a stand-alone network printer. Finally, you can print to a print server, such as that of AppleShare IP, that resides on one computer but controls multiple printers.

In this chapter we will look at AppleTalk printing and see how AppleShare IP's new print spooler makes it easier and faster over your network.

# HOW PRINTING WORKS

All Mac OS print jobs begin at the Chooser. This application can be launched from the **Apple** (🍏) menu bar item. Here you choose an icon that represents the device to which you will print. The icons represent each device's *printer driver*.



---

FIGURE 7-1: Opening the Chooser.



---

FIGURE 7-2: QuickDraw printer drivers for ImageWriter, StyleWriter, and Color StyleWriter Pro; PostScript printer drivers for Personal LaserWriter and networked LaserWriters.

All devices on the network that can communicate with the driver you select will appear in the Chooser (right side). If your network has zones (lower left), you will also need to choose the one in which the preferred device is resident.

You do not have to do this each time you actually print. The computer stores your choice in its battery-powered Parameter RAM (PRAM) and remembers it until you change it. (If you are using a version of the Mac OS that supports Desktop Printing, a desktop printer is also created.)

When you execute an application's **Print** command, it uses QuickDraw and the Font Manager to convert the document into Postscript commands, which can then be sent to the communications port. The Printing Manager is also called upon to load into RAM the printer driver for the device last chosen in the Chooser. Then the printer driver calls on AppleTalk to contact the printer. At this point, network printing begins.

As with the file server transactions illustrated in Chapter 4, a workstation relies on the Name Binding Protocol (NBP) to locate the printer. It also relies on the AppleTalk Transaction Protocol (ATP) to transport data to the printer. There the likeness ends. Instead of using the AppleTalk Session Protocol (ASP) to control the process, the *Printer Access Protocol (PAP)* is used. Instead of sending file read/write commands (e.g., AFP), PostScript commands are sent to the printer.

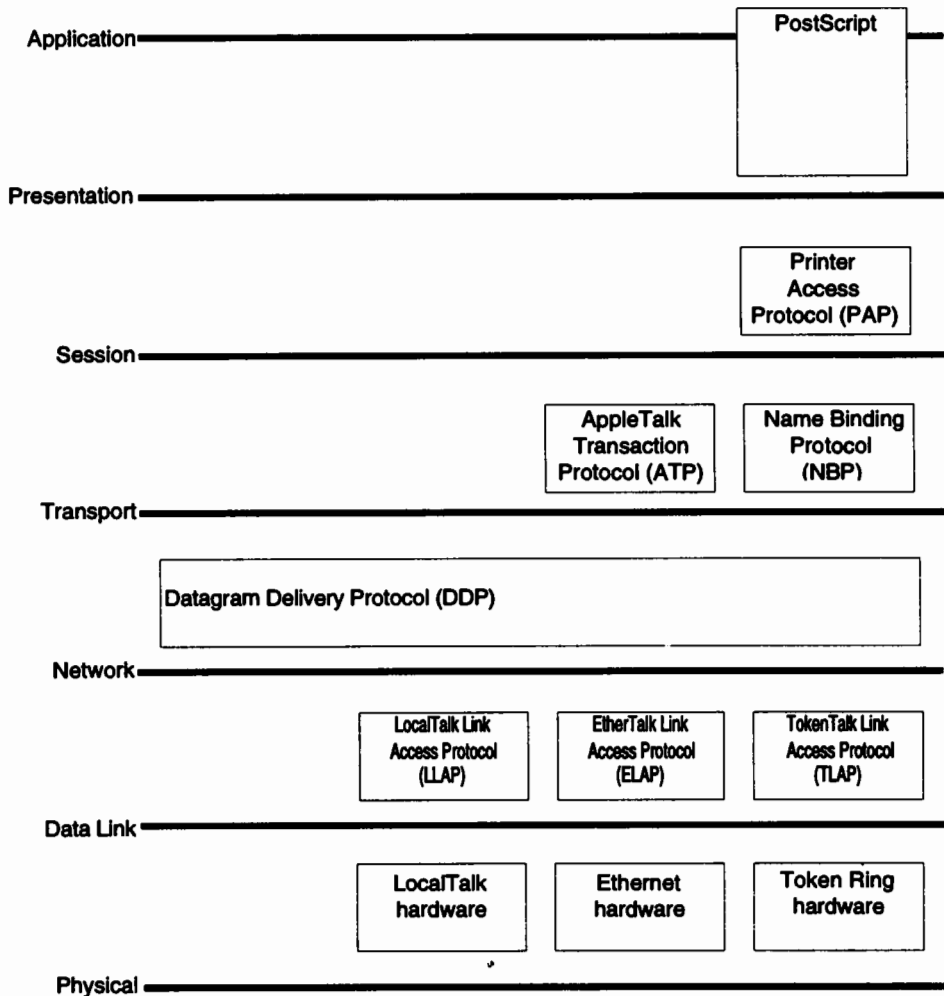


FIGURE 7-3: PostScript and PAP in the OSI model.

For the purposes of AppleTalk, all print jobs are sent to *print servers*. A print server can be a network-capable printer, such as a LaserWriter, or it can be an application such as the AppleShare IP Print Server. Do not let this confuse you. Both make themselves visible on the network with a



Session Listening Socket (SLS) on which they register their names. The practical difference between the two is that a printer can handle just one job at a time, while a print server can handle multiple jobs and multiple printers.

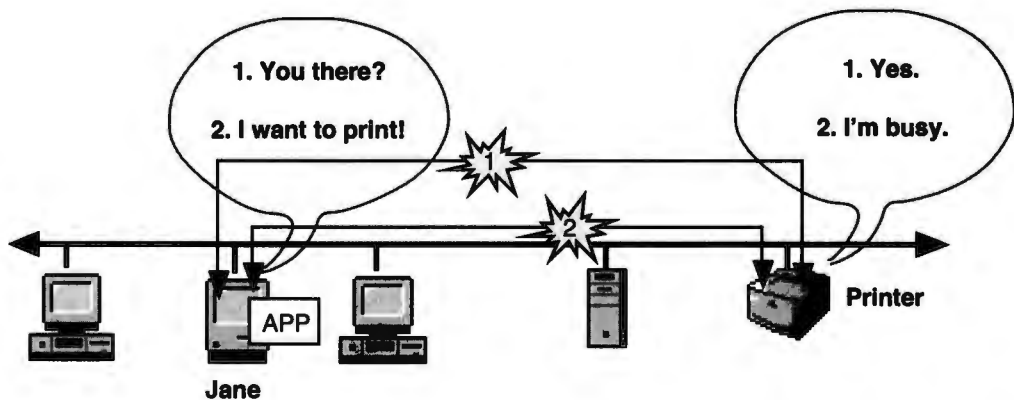


FIGURE 7-4: Printer identity confirmed, waiting to print.

1. Although Jane might have selected the printer in the Chooser weeks before the print job and her choice is remembered, the Printing Manager still calls on NBP to verify that the printer she chose is on the network and using the same name and AppleTalk network number.
2. Once NBP has verified the print server's address, the printer driver will use PAP to attempt to open a connection.

If the printer is busy when Jane's workstation requests a print job, it will return a status message while PAP continues to establish the connection. When the printer is free, it will interpret all incoming print requests and respond first to those workstations that have been waiting the longest. If this workstation happens to be Jane's, the printer will tell the printer driver that it is ready to receive her print job.

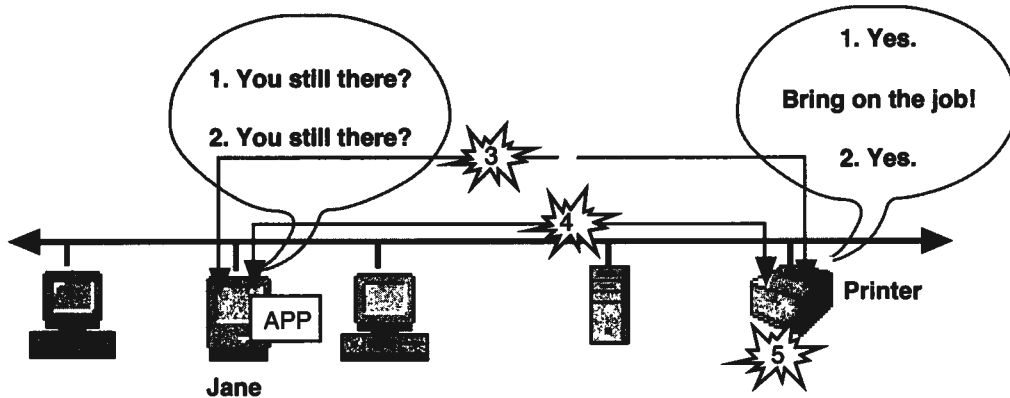
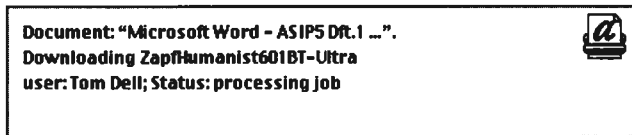


FIGURE 7-5: Workstation-to-printer communication using PAP/ATP.

3. When a connection has been established between the workstation and the printer, PAP calls on ATP to transfer the data. While the PostScript file is being transferred to the printer's RAM, the workstation and the printer maintain a constant dialog similar to this one:



PAP is now in its data transfer phase, which has two functions. First, PAP maintains the smooth transfer of data between the workstation and the printer using a model referred to as *read-driven*. This means that when the printer is ready to receive data from the workstation it issues a PAP Read call to the workstation's responding ATP socket.

When the printer requests a transaction, the workstation must respond within a specified length of time. If a responding packet does not make it to the printer in time, perhaps because of a collision, the printer issues additional requests until it gets what it wants.

4. PAP's second job during this process is to detect and disconnect any half-open connections that can occur when a workstation bombs or

hangs. If either device in the PAP connection discovers that the other device is no longer responding, the connection is closed.

5. At the printer, the PostScript data is stored in RAM until enough is present to begin printing. The actual printing process is a wonder of precision that requires that the exact amount of data be copied to the engine's electrically charged drum while the paper is in the exact place and while data continues to flow into the machine's memory buffers.

This process is an example of *direct printing*, although most Mac OS users do not use this method. While the workstation is sending such a print job it cannot do anything else until the printer has finished. Depending on the print speed and installed RAM of the printer, as well as the size and type of file it is being asked to process, this can take quite a while. Most Mac OS users resort to the default *background printing* to save time.

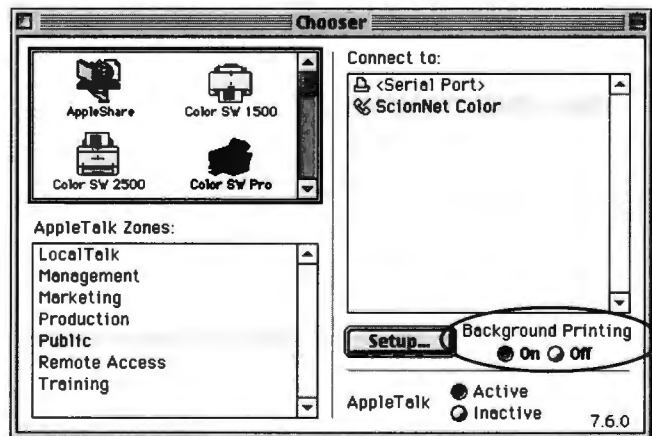
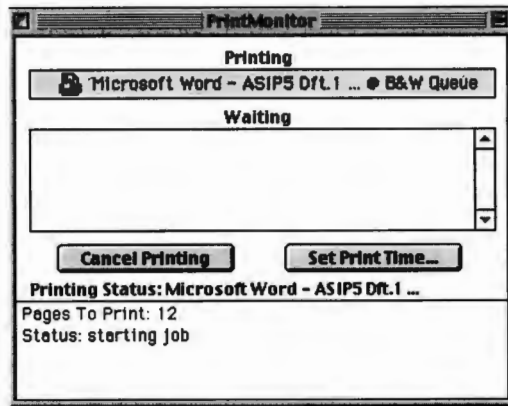


FIGURE 7-6: Enabling background printing in the Chooser.

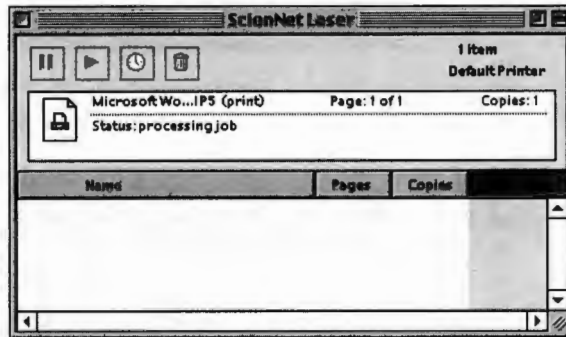
Under the background printing model, the application passes its job to a small system application called Print Monitor. After the PostScript file is *spooled* to the hard disk, the application that created it is free to go on to other tasks. Print Monitor then calls on the printer and processes the job "in the background." Multiple print jobs can be sent to the Print Monitor and which are then said to be in *queue*.



---

FIGURE 7-7: The original Print Monitor.

The Mac OS has two versions of this application. The traditional Print Monitor becomes available under the Finder only when called upon to print. The Desktop Print Monitor, available since System 7.5, can be accessed at any time by double-clicking on the active printer's desktop icon.



---

FIGURE 7-8: The Desktop Print Monitor.

While background printing frees up the workstation for other things, it does so at the price of processor performance. It can also require significant amounts of free disk space in which to create its spool files.

A further improvement is introduced by a dedicated print spooler such as the one offered by AppleShare. Under this model, a server acts as an intermediary between workstations and network printers. There are several advantages to this. First, the workstation is relieved of the performance degradation associated with a big print job. Second, while a printer can handle only one job at a time, a print server can accept multiple jobs and pass them out to multiple printers simultaneously.

The print server advertises itself on the network in the same way a printer does. It is accessed in the same manner, via the Chooser.

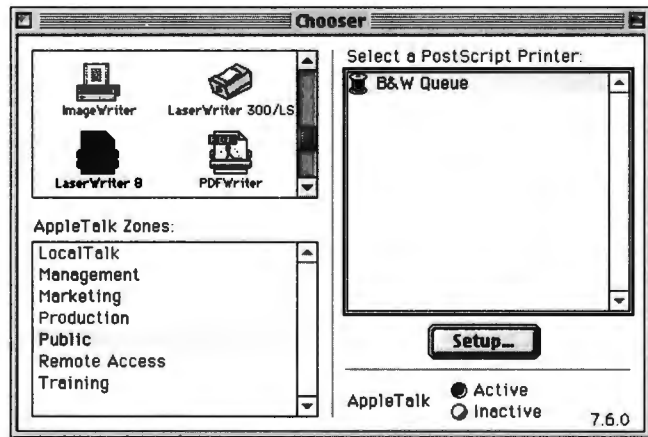


FIGURE 7-9: Choosing a Print Server.

Before we examine the AppleShare IP Print Server, let's go over the installation of its remote components, networked printers.

# INSTALLING NETWORK PRINTERS

Many laser printers from Apple, HP, and others can be connected directly to your LocalTalk or Ethernet network. These are the types of devices we generally think of when we talk about “network printers.” Some printers can also be attached to a workstation and shared with other workstations in much the same way that folders are shared using Personal File Sharing. In both cases, some setup is required.

## Installing an AppleTalk-Enabled Laser Printer

Laser printers are the workhorses of most modern offices. Although they cost a fraction of what they once did, it still makes good fiscal sense to share them among multiple users via the network.

### Connect the Printer

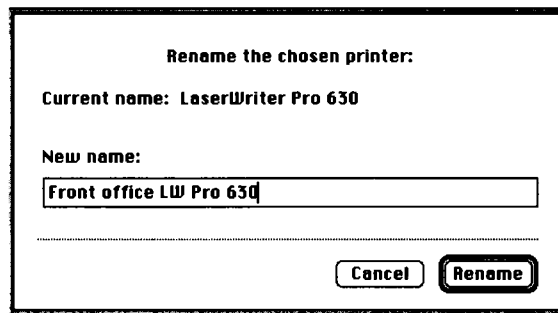
The first step required to install a network printer is to attach it physically to the network with a cable. Many printer manufacturers describe their devices as being “AppleTalk-capable,” but they neglect to tell you which cabling topology it requires. Most medium and higher-end printers have built-in Ethernet, but many permit only LocalTalk. If you find you have purchased a LocalTalk printer but you have an Ethernet network, you may still use it by purchasing an additional LocalTalk-to-Ethernet bridge, such as the EtherWave adapter made by Farallon Computing.

Once you have attached the printer and turned it on, it will usually print out a test page to let you know it is operating properly.

## Rename the Printer

By default, the newly installed printer will create its own name and advertise itself on the network. Unfortunately, these names are not very helpful when there are more than one printer on the network. What information will show a user the difference between one “LaserWriter” or “LaserJet” and another? One could be in the next room while another could be in the next building. How is a user to know?

To make selecting a printer easier for users, rename them according to some methodology that makes sense in your organization. This can be done from a remote Macintosh using the utility software that came with the printer.

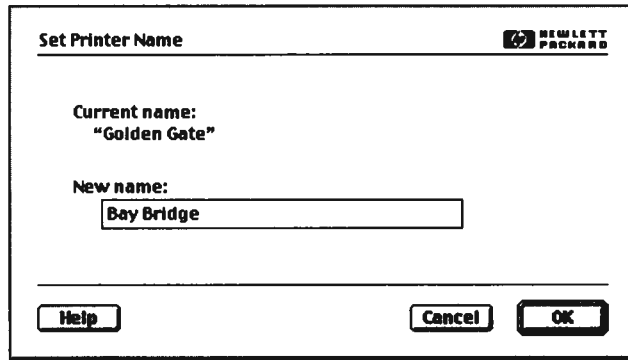


---

FIGURE 7-10: Renaming a LaserWriter.

One of my former employers used a whimsical method, naming networked printers after famous swords, “Excaliber,” “Stormbringer,” and so forth. This was not a very useful scheme because it did not tell anyone what the printers were or where they were. A better scheme would be something like “Front office LW Pro 630” or “Administration LaserJet 6P.”

One of my clients in San Francisco has numerous HP LaserJet printers of exactly the same type. To distinguish them, they have adopted the names of local landmarks, all of which are visible from the office’s windows. If you print to “Golden Gate,” you are printing to the western-most printer in the building. If you print to “Alcatraz,” you are printing to the northern-most printer. This scheme works well for them.



---

FIGURE 7-11: Renaming a LaserJet.

When I was younger, I ran a desktop publishing service bureau. We had several laser printers that shared a network with an imagesetter. Printers were still expensive then, so people would rent time on our computers to print out work they had created at home or in school. Unfortunately, I would get customers who did not know the difference between Hewlett-Packard and Linotype-Hell and selected the imagesetter in the Chooser. Since laser copies were \$.02/page and photo paper was \$10/page, this was a nasty surprise for many. We tried signs. We tried pre-configuring all the machines. Nothing worked. Finally, we renamed the imagesetter so that it was listed in the Chooser as "Erase and Shutdown Mac." That worked.

## Set the Printer's Zone

If your printer is in an Ethernet network, you have the additional option of putting it in a specific zone. The same rules that apply to your original zone-naming conventions apply here. If your zone list is modeled after departments, for example, move the printer into the zone associated with the department that will use it most.



## Configure Printer Defaults

Depending on what task the printer is being asked to perform most often, you might wish to adjust some of its default settings. For example, your HP LaserJet may default to 600 dpi resolution. If you know that its users are printing only text and never graphics, you can save a great deal of money on toner by switching to a lower resolution, without noticeably affecting print quality.

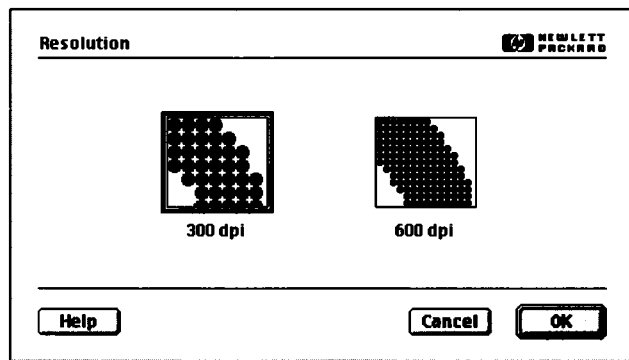


FIGURE 7-12: Adjusting resolution.

Many printers also print a startup page every time they restart. Since this tends to waste a lot of paper, you might want to disable this function.

Finally, if the printer has multiple paper trays, you can select the tray that will be used as a default when users do not specifically choose one. That can help prevent people from accidentally printing their email on 11-by-17 paper!

**A word about speed.** Speed becomes an issue on networks whose users print large jobs or need to print their data quickly. Contrary to popular opinion, moving a printer from LocalTalk to Ethernet or Fast Ethernet will not really feed your need for speed. It is the speed of the printer *engine* that is the real bottleneck. Having a printer on Ethernet as opposed to LocalTalk will get the data to the printer faster, but it will still print at the same rate thereafter. If you want to speed up network printing, print at lower resolutions, buy printers with the fastest engines available, and load your printers with RAM and resident fonts.

## Sharing a QuickDraw Printer

In general, it does not make much sense to attach a local printer to a workstation to share its services with many users, for the same reason that it is not a good idea to expect Personal File Sharing to support heavy-duty file server needs. It is slow and the performance degradation on the workstation can be significant. If, however, a workstation is attached to a special purpose printer that others may wish to use *occasionally*, printer sharing is a great idea.

For example, imagine that one of your Macintosh users has the only color printer in the building. It would not do to have other users printing out entire reports on it, but the occasional color report cover might not be a problem.

### Attach the Printer

The Macintosh is equipped with two serial ports, labeled printer and modem. The printer port is the traditional LocalTalk interface most often used for attaching printers, but you are not restricted to this port when attaching a printer. If a Macintosh is connected to a LocalTalk network through the printer port, you can attach the printer to the modem port so that the Macintosh remains connected to the network. The selection is made in the Chooser.

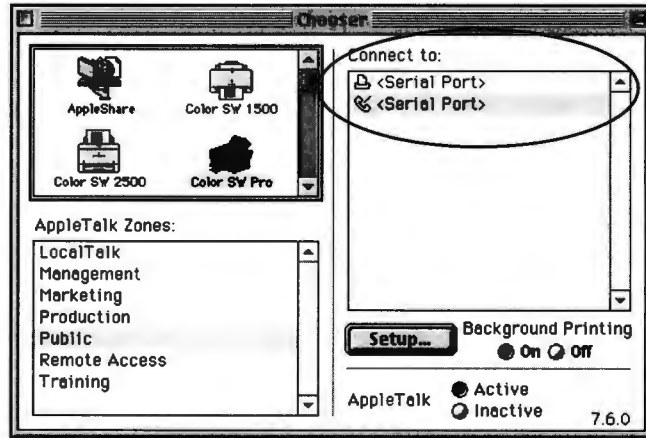


FIGURE 7-13: Selecting a printer connection in the Chooser.

## Share the Printer

Next, press the **Setup** button in the Chooser. This opens the Sharing Setup window, in which you put the printer on the network by selecting the **Share this Printer** checkbox.



FIGURE 7-14: Sharing and renaming a local printer.

You should also assign the printer a meaningful name. The new name will appear in the Chooser as other users will see it.

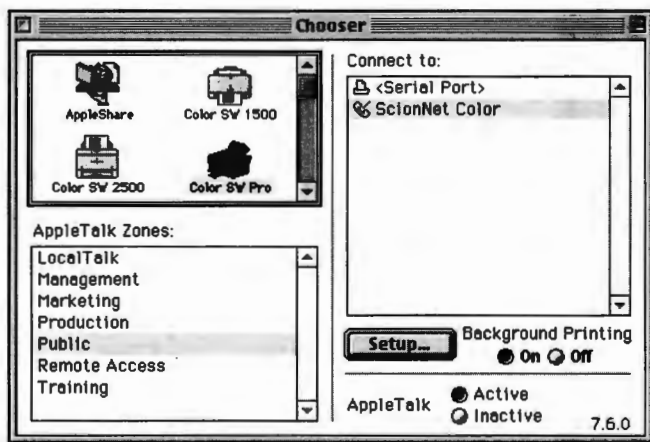


FIGURE 7-15: Viewing a shared printer in the Chooser.

Note that **Background Printing** is enabled by default. You should not share a local printer if the computer to which it is attached does not have enough hard disk space to accommodate a good-sized print spool. I recommend no less than 20 Mbytes of free disk space.

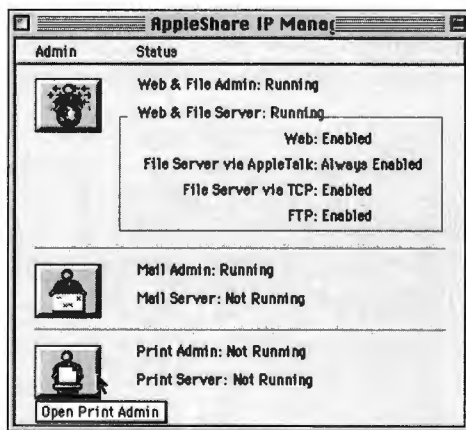
Although the printer is now available via the network, other users must have the proper printer driver installed on their workstations if they are to use it. They will also need to “set up” the printer to use the correct *PostScript Printer Description (PPD)* file and, in some cases, other components such as the ColorSync control panel. These details will be covered in Chapter 8.

## INSTALLING THE PRINT SERVER

You may centralize your network printing by making its laser printers part of one or more AppleShare IP print queues. This is the fastest way to free up a user's workstation at the beginning of a print job. Also, since the Print Server can administer multiple printers and distribute incoming jobs evenly, it is the most efficient way to increase printing throughput. It can support as many as 32 simultaneous print jobs.

### Launch Print Server Admin

To use the Print Server for the first time, launch the Print Server Admin application. If you have AppleShare IP Manager running, press the third button in the window (or choose the **Open Print Admin** command under AppleShare IP Manager's **File** menu bar item). You can also double-click on the application directly.



---

FIGURE 7-16: Launching Print Admin from AppleShare IP Manager.

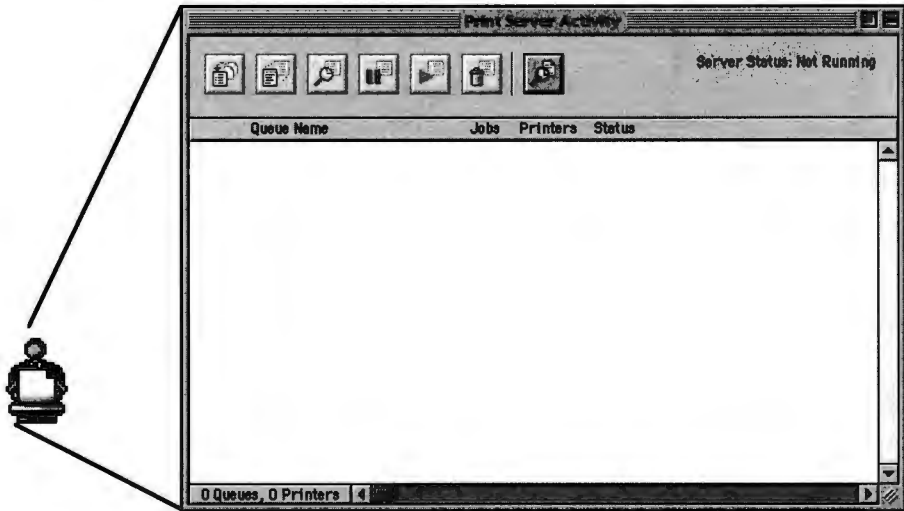


FIGURE 7-17: AppleShare IP Print Server Admin and its Print Server Activity window.

This will open a password dialog box in which you must enter the **Administrator Name** and **Password**. Press the **OK** button when you have done this. The Print Server Activity window will appear. This window is designed to tell you which printers are attached to your server and how busy they are.

## Launch Print Server

If the Print Server application is not already running, you can launch it manually by choosing the **Start Print Server** command under Print Admin's **Server** menu bar item (or by pressing the **Command (⌘)-I** key combination). The Server Status line in the upper right of the Print Server Activity window will change to read "Running."

## Create Queues

Next, press the **New Queue** button in the Print Server Activity window (the first on in the upper left) or select the **New Queue** command from the **Server** menu bar item (or press the **Command (⌘)-N** key combination). This will open the New Queue dialog box with **General** selected in the upper left pop-up menu by default.

What you type in the Name field is what users will see in their Choosers when they select the queue. It can be up to 31 characters long but must not include a colon (:), equal sign (=), or approximately equal sign (≈). The name must be different from that of any other queue or printer in the same zone, with one exception.

When you add a printer to a queue, you have the option of making it visible or invisible in the Chooser. If you leave it visible, it will be accessible to users both directly and via the queue. If you make it invisible, it will be accessible only via the queue. In the latter case, the queue could have the same name as a single printer, effectively replacing it as seen from the Chooser. This would give users faster performance without confusing them with name changes.

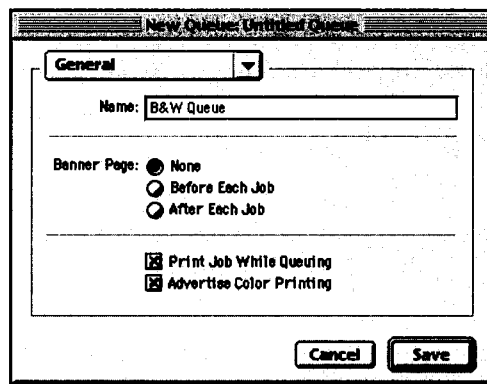


FIGURE 7-18: Establishing a queue in the New Queue dialog box.

Each queue may be serviced by one or more PostScript printers, but they must all be of a similar type. This is because they will all use the PPD file

used by the first printer selected in the queue. (The PPD file contains information about each printer's capabilities, such as what resolution it may use to print and how many paper trays it has.)

The Print Server will support any printer compatible with the LaserWriter 8.4 printer driver. This includes Apple LaserWriters and many third-party products, such as HP's LaserJet series (PostScript). A logical naming convention might involve reference to the printer's shared capabilities, such as "B&W Queue," "Color Queue," "Imagesetters," "Large Format," or "High-Res Queue." You can create as many as 10 queues and attach a total of 30 printers.

There are a few other choices to make here. If you want a banner printed with each job, you may enable this feature in the Banner Page field. Banner pages list the name of the file that was printed and the name of the user who printed it, which can be useful for distribution.

If the **Print Job While Queuing** checkbox is selected, the Print Server will begin the job before it has spooled a user's entire file. That makes the process faster. However, if the connection between client and server is severed during a job, the user will need to queue the entire job again.

If the **Advertise Color Printing** checkbox is selected, a color icon appears next to a queue's name in the Chooser when the first printer in that queue is color-capable.

## Attach Printer(s)

Select **Attached Printers** in the New Queue window to bring up a Chooser-like list of the printers on your network.



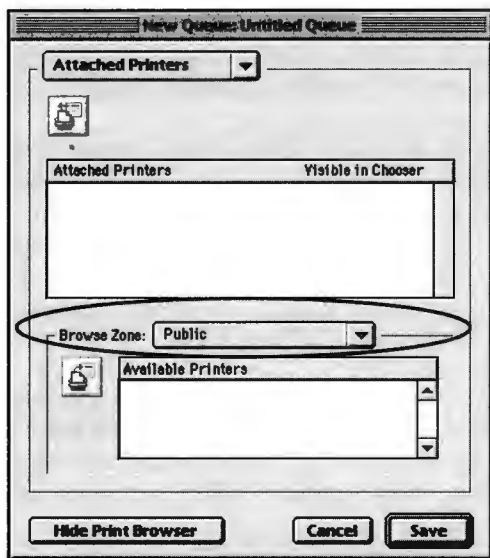
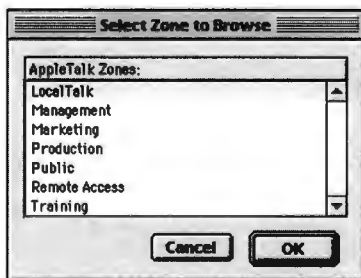
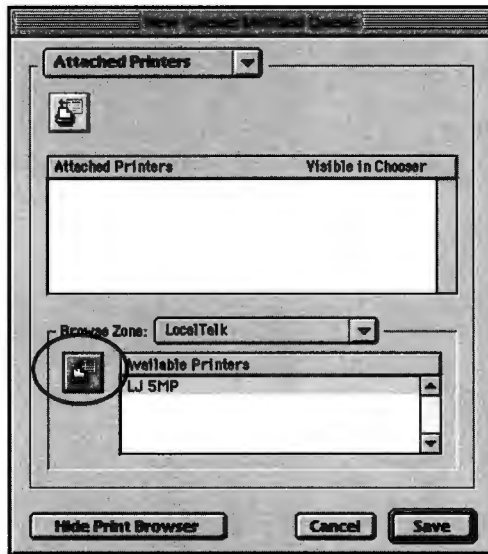


FIGURE 7-19: Looking for printers in the New Queue window.

The zone listed initially in the Browse Zone pop-up menu will be the server's default. Click on this pop-up menu and choose the **Other** command to add additional zones.

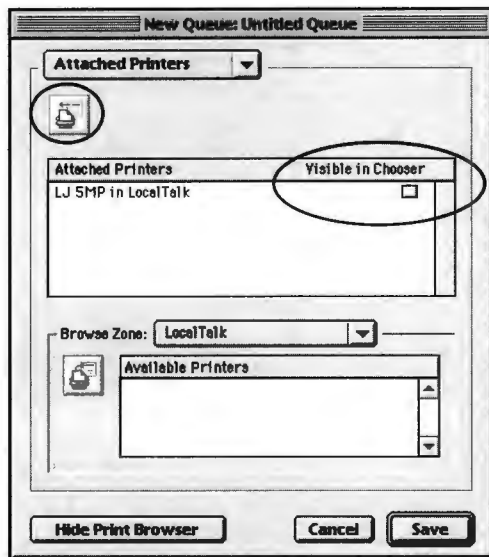




---

FIGURE 7-20: Attaching a printer.

Select a printer that you wish to make part of the new queue in the Available Printers list; then press the **Attach Printer** button (lower left). The printer will be added to the Attached Printers list. To remove the printer from the list, press the **Detach Printer** button (upper left). To make the printer accessible directly as well as via the queue, enable the **Visible in Chooser** checkbox. Press the **Save** button when you have finished.



---

FIGURE 7-21: Working with an attached printer.

The new queue will appear in the Print Server Activity window. Click on the triangle to expand the list item and see the printers that make up the queue.

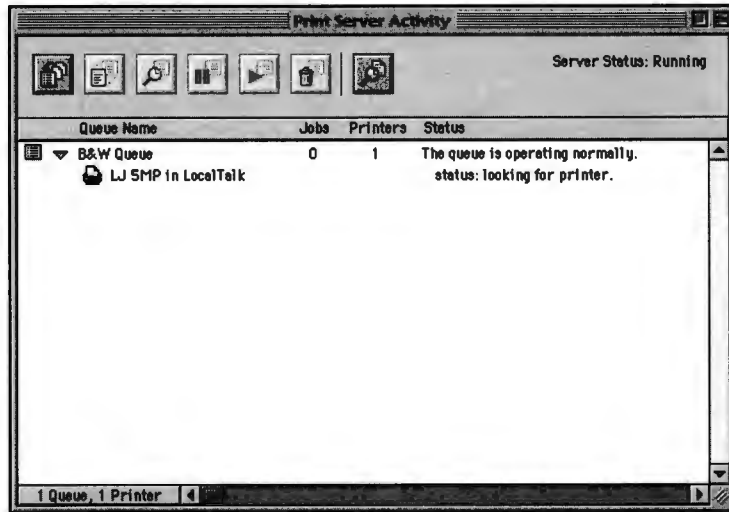


FIGURE 7-22: Viewing a new queue in the Print Server Activity window.

## Enable Automatic Startup

If you want the Print Server to start up automatically whenever the server computer is restarted, select the **Print Server Settings** command under the **File** menu bar item. In this dialog box you may also select a server volume other than the Startup Disk on which to store spool files. Press the **Save** button when you have finished.

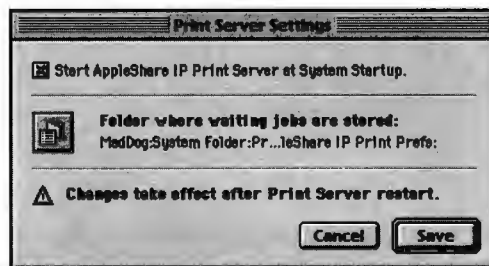


FIGURE 7-23: Enabling automatic startup.

# PRINT SERVER ADMINISTRATION

Once set up, the Print Server is self-sufficient and rarely requires your intervention. Moreover, it has several useful management features, however, which can be accessed through Print Admin.

## Managing Print Server Activity

The Print Server Activity window is used to view and work with all of the Print Server's queues.

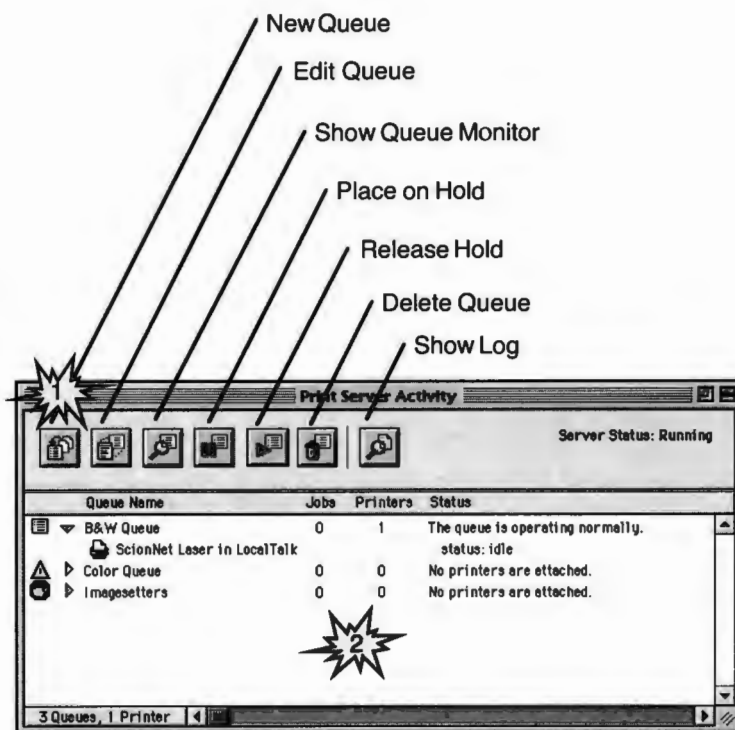


FIGURE 7-24: Working with the Print Server Activity window.



The button bar permits access to all of the basic commands that can also be found under the **Server** menu bar item. These permit you to create, edit, monitor, and delete each queue and to suspend any job within a queue. You may also open the log from here.



The actual activity pane lists its queues and shows the printers in the queues, as well as what those printers are working on and how many jobs are pending. There are two warning icons possible here. The Alarm icon tells you when there is a problem with the queue and explains the problem under the Status column. The Stop icon tells you that the queue's activity has been suspended.

## Managing Print Queues

To work more closely with a given queue, double-click on its item in the Print Server Activity window or select it and press the **Queue Monitor** button (or select the **Show Queue Monitor** command from the **Server** menu bar item). The Queue Monitor window is used to manipulate the workings of a specific queue.

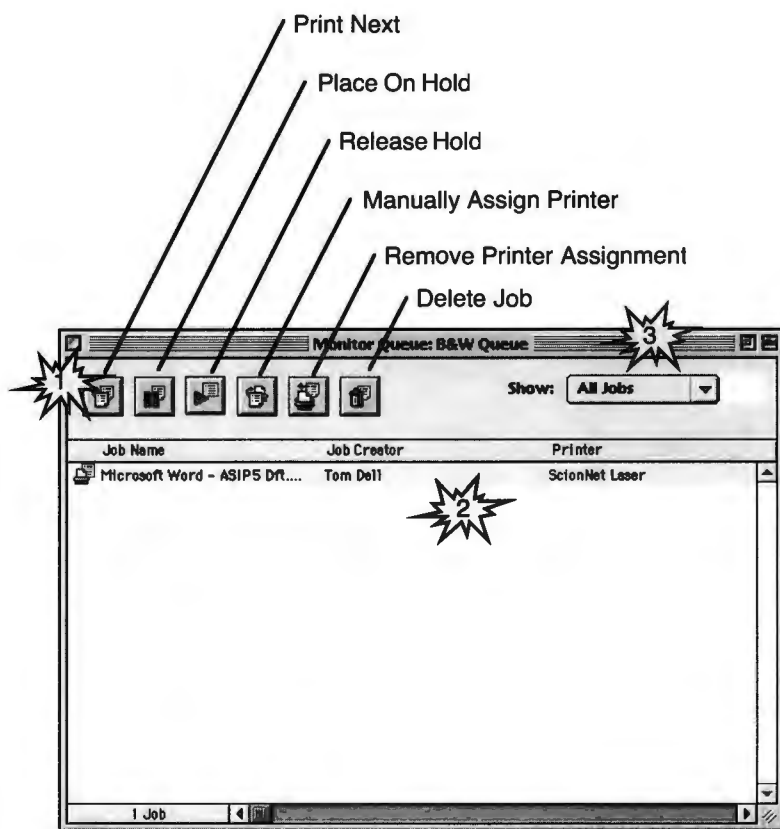


FIGURE 7-25: Working with the Print Queue Monitor window.



The button bar in this window is similar to that of the Print Server Activity window, but provides some additional capabilities. For example, in addition to being able to suspend a print job, you can move it up in line (**Print Next** button) or delete it altogether. You can also manually direct it to a specific printer within the queue.



The Activity pane lists the names of the documents being printed and their creator applications, the user who is printing, and the specific printer that is handling the job.



In the Show pop-up menu, you can choose to view the contents of the Queue Monitor window by **All Jobs**, **Printing Jobs**, **Waiting Jobs**, or **On Hold Jobs**.

## Working with the Print Log

To view your Print Server's operational history, press the **Print Log** button (or select the **Show Log** command from the **Server** menu bar item).

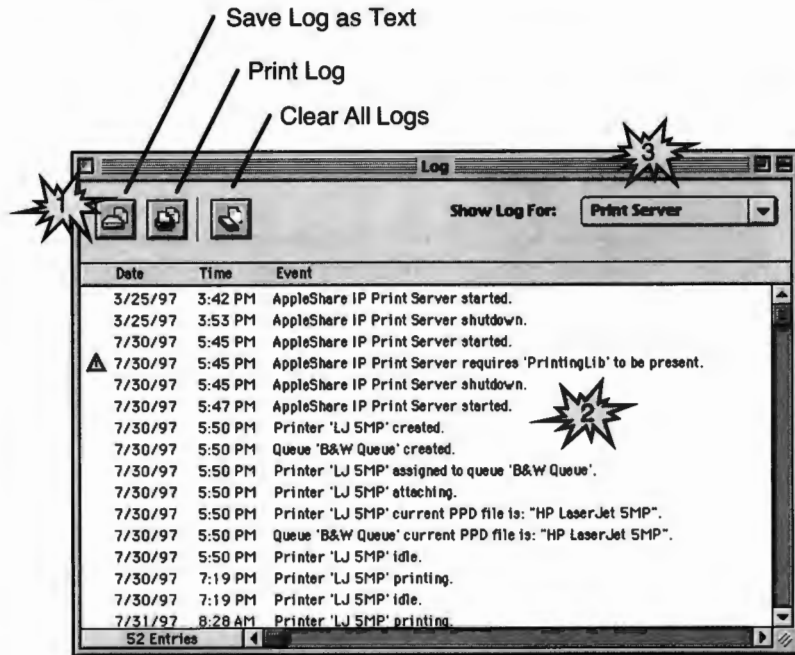


FIGURE 7-26: Working with the Print Log window.



The button bar can be used to save the log's contents (64 Kbytes) in a text file, to print it, or to clear its entries.





The Activity pane lists significant events, such as when the server was started or stopped, when queues were created and deleted, and, most important, what jobs were printed and when.



In the Show Log For pop-up menu, you can choose to view the contents of the Print Server Log window by **Print server**, **All Queues**, **Waiting Jobs**, or specific queues.

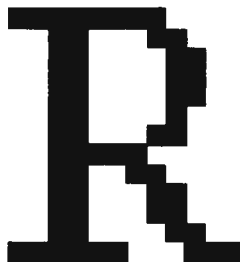
## Working with Fonts

No discussion of printing can be considered complete without a description of the fonts used across your network.

### Font Types

Since the Mac OS is GUI, what appears on the page begins on the screen. Whether you are writing a report, designing a graphic, or doing 3D modeling, everything you create is translated from your keyboard strokes and mouse movements into a numeric code and is displayed using QuickDraw. Under QuickDraw, everything is drawn by arranging 72 pixels within every inch of screen space. That is the *screen resolution*.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z



---

FIGURE 7–27: Bitmap fonts are forced to conform to screen resolutions.

**Bitmap fonts.** *Bitmap fonts* present the text you see on the screen. They were used in early printers, such as the Apple ImageWriter, as well. The characters in bitmap fonts are created within a grid of black and white dots. The 72-dpi grid size corresponds to the standard screen resolution that QuickDraw uses when it draws what appears on a Macintosh monitor. One example is the font Chicago, which has shipped with every Mac OS since 1984. Its characters look round in small sizes, but if you look closely you can see that they comprise squared pixels. The jagged look is the result of forcing Chicago to conform to the 72-dpi grid.

Bitmap fonts need multiple versions for the different sizes that are to be displayed on the screen. These were available in common sizes—8, 10, 12, 14, 18, 24, and 36 points—but if you wanted a non-standard point size it could get pretty ugly. The Macintosh would try to expand the nearest-size font it had into that grid.

**PostScript fonts.** Monitors use pixels to draw their images; printers use dots. The more *dots per inch*—or the denser the dot pattern—the better the printed document looks. When printer resolution improved to support 300 dpi and more, PostScript became available to take advantage of it. It added an extra level of complexity to Macintosh printing, however, as a special driver was required to translate the screen's QuickDraw commands into the printer's PostScript commands.

Adobe's Type 1 PostScript fonts come in two types. Screen fonts are bitmap fonts that draw their images to the screen using QuickDraw. Printer fonts, or *outline fonts*, are used only by the printer. Both must be present in order to print.



---

FIGURE 7–28: Adobe Type 1 PostScript fonts require a “suitcase” of screen fonts and separate printer fonts.

Outline fonts use a mathematical formula of Beziér curves to define character shapes and to enlarge or reduce the shapes to accommodate the highest resolution of the printer. Instead of imaging the font as a series of dots, Beziér curves draw an outline of the font that is then filled in with dots when the font is printed.

This system makes for great printer output, but the fonts as seen on screen look rough. Worse, since the metrics are so different, word positioning as seen on the screen might be very different from what comes out on paper. To correct this, Adobe released Adobe Type Manager (ATM) in 1989. This little application works like a PostScript printer to rasterize font outlines into the pixels needed for smooth on-screen display. As a second benefit, ATM permits you to print PostScript fonts on non-PostScript printers such as the Apple StyleWriter series, HP's DeskJet series, and even the old ImageWriter.

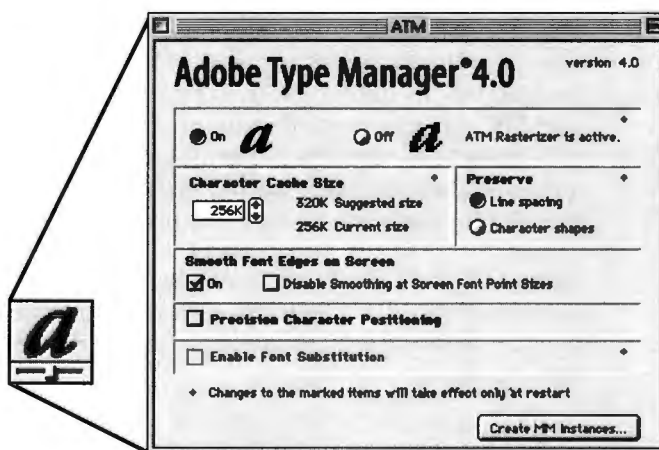


FIGURE 7-29: Viewing the Adobe Type Manager control panel.

**TrueType fonts.** Because of these problems and licensing issues, Apple and Microsoft allied in 1990 to develop *TrueType*, an outline font that uses a new algorithm with QuickDraw (similar to ATM). In TrueType, only one outline font for each typeface is needed for displaying and printing the typeface to both PostScript and non-PostScript printers.



---

FIGURE 7-30: TrueType fonts can be used both on screen and with printers.

TrueType fonts are particularly useful in mixed Macintosh/PC networks because they can be used with both the Mac OS and Windows.

**QuickDraw GX fonts.** When I started out in newspapers, part of my job was to set type with a Compugraphic imagesetter. Inside this machine, which was about the size of a refrigerator, was photosensitive paper onto which light was projected through a spinning font wheel to produce each letter that was typed. To tell the machine which letter I wanted—and in what size, font, pitch, kerning, leading, style, and position—I had to type a ridiculously long string of commands that would scare a UNIX programmer. When Paul Brainerd came out with PageMaker for the Macintosh 1.0 and I was given a lightening-fast MacPlus with an entire megabyte of RAM, it greatly improved my productivity. I did not have to process the film, and I could do pagination on a *What You See Is What You Get* (WYSIWYG) screen. The actual typographic quality was not nearly as good, however.

In an effort to increase the quality of its printing technologies, Apple introduced QuickDraw GX as an add-on to System 7.5. It permits the use of advanced typographical controls such as ligatures, fractions, kerning, and tracking, and each font can support 65,000 characters. The quality made possible by QuickDraw GX is impressive.

Unfortunately, no major applications support QuickDraw GX. It requires special GX-specific fonts, and it degrades performance noticeably.

When you install QuickDraw GX, it provides updated printer drivers and translates your Type 1 and TrueType fonts to be GX-compatible. Unfortunately, it only updates printer drivers for Apple products. If you have a printer from any other manufacturer on the network, it will seem to disappear from the Chooser and become inaccessible unless its manufacturer has created its own GX drivers and you have installed them. The same is true for other Chooser extensions such as fax and electronic document drivers.

Finally, users cannot exchange GX fonts with users on non-QuickDraw GX workstations.

## Font Tips

Whether they print to networked printers directly or to the AppleShare IP Print Server, your users will have the fewest printing problems if you adhere to the following rules:

- **Avoid mixing font technologies.** If possible, limit your users to just Type 1 or just TrueType. A lot of productivity is lost when a user creates a document using Type 1 and exchanges it with a user of TrueType, who then finds that the line spacing has changed. If you have both Mac OS and Windows users who are not printing anything complicated, stick with TrueType. If you have users producing complicated designs or art, you will have fewer problems if you stick to Type 1. One caution: Remind users that they need both the screen font and the printer font to use Type 1.
- **Use QuickDraw GX for all.** If you decide to use QuickDraw GX, install it throughout the organization and at the same time so that you can standardize on the GX fonts. Users cannot exchange these fonts with users of non-QuickDraw GX computers.
- **Standardize your fonts.** Although it is probably a bit Draconian to force users to use *only* the fonts you choose, it is a great idea to create at least one standard package for the organization as a whole. Users may then use fonts from the package for important documentation without fear that it cannot be printed properly by a co-worker. You can also pre-load these fonts into your printers' RAM, making network printing faster since the fonts will not need to be downloaded first.

## SUMMARY

There are several ways to print from a Mac OS computer: locally from a workstation to an attached printer; remotely over the network to a printer connected to, and shared from, another workstation; remotely to a stand-alone network printer, such as an Apple LaserWriter; or to a Print Server, such as with AppleShare IP.

The AppleShare IP Print Server speeds up network printing by taking in multiple print jobs and doling them out to multiple printers gathered into queues. The server, which is configured and monitored using the Print Admin application, supports 10 queues, 30 printers, and as many as 32 simultaneous print sessions. It works with laser printers that are compatible with LaserWriter driver 8.4 and newer.

Several font technologies can be used in Mac OS printing. To experience the fewest problems, it is best to standardize on a single set of fonts using the same technology throughout the organization.

If speedy network printing is all- important to you, be sure to read about RUN, Inc.'s RunShare software in Chapter 12.



# 8

## AppleShare IP Client and User Support

No matter how powerful your server computer or how feature-rich your server software, it will fail to live up to its full potential unless the people in your organization know how to use it properly.

The first half of this chapter does not follow the format of earlier chapters, which were written with the AppleShare administrator in mind. This section is written primarily for AppleShare users. In it I will present a series of short procedures designed to make users comfortable with the basic network-related functions of the Mac OS computer.

In the second half of this chapter, I will return to addressing AppleShare administrators. I will tell you about some of AppleShare IP's



client management features. I will also show you some advanced network management tools that can make the job of user support easier.

## CONFIGURING OPEN TRANSPORT

To use all of the features of the AppleShare IP server, your computer must be using the *Open Transport* networking system. You can determine which networking components a Mac OS computer is using by looking in the **Control Panels** folder under the **Apple ()** menu bar item. If you see a **Network** control panel, then the computer is using “Classic Networking” and not the newer Open Transport. *MacTCP*, the TCP/IP component of Classic Networking, will not permit faster TCP connections made possible by AppleShare IP.

If you see a **TCP/IP** or **AppleTalk** control panel, the computer is using Open Transport. Open one of these control panels, and then choose the **Get Info** command from the **File** menu bar item to find out what version is being used.

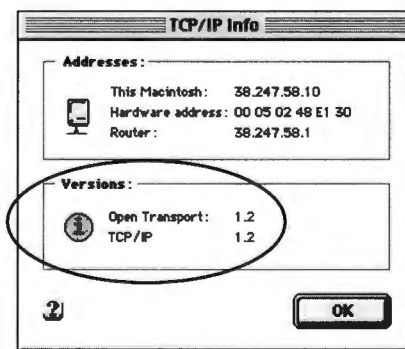
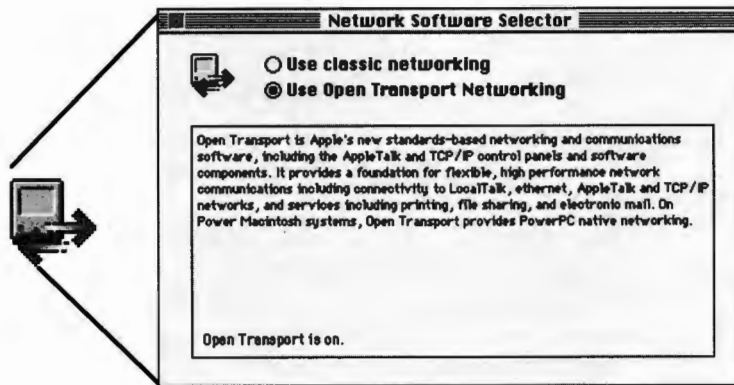


FIGURE 8-1: Determining the Open Transport version.

To use AppleShare IP, your computer must have Open Transport version 1.1.2 or higher installed. It may be that your computer is capable of using

Open Transport but that the system has not yet been enabled. In that case you can switch it by using the Network Software Selector application in the “Apple Extras” folder on your computer’s hard disk.



---

FIGURE 8–2: Switching to Open Transport with Network Software Selector.

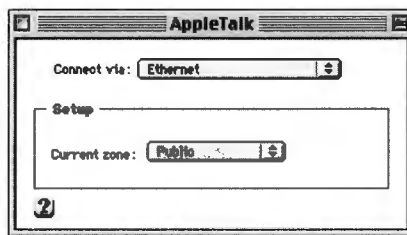
Select the **Use Open Transport Networking** button; then restart the computer to make Open Transport active.

## Configuring AppleTalk

If your computer has Open Transport installed and is operating properly (you can print, see file servers in the Chooser, etc.), then you probably do not need to configure the AppleTalk control panel.

Your administrator might tell you that you need to change some of the AppleTalk control panel’s settings in order to use the AppleShare IP server. In this event, you will need to know:

- which hardware interface to use to connect to the AppleTalk network
- your AppleTalk *zone*



---

FIGURE 8-3: Configuring the AppleTalk control panel.

The AppleTalk interface is the method your computer uses to connect to the network. It is listed next to the **Connect via** pop-up menu. Your network may or may not be divided into zones. If it is, you will be able to make choices in the **Current zone** pop-up menu. Change these settings only in consultation with your administrator.

## Configuring TCP/IP

If your computer has Open Transport installed and is operating properly (you can surf the Web, etc.), you probably do not need to configure the TCP/IP control panel.

Your administrator might tell you that you need to change some of the TCP/IP control panel's settings in order to use the AppleShare IP server. In this event, you will need to know:

- which interface to use to connect to the TCP/IP network (e.g., **AppleTalk (MacIP)**, **Ethernet**)
- how to get your IP address (e.g., **Manually**, **BootP**, **DHCP**, **RARP**)

How these questions are answered will determine how much additional information you will need. Under some configurations, information is supplied to your computer by a special server (MacIP, DHCP, etc.). In others, you must enter information manually. The information you need in order to configure TCP/IP manually is:

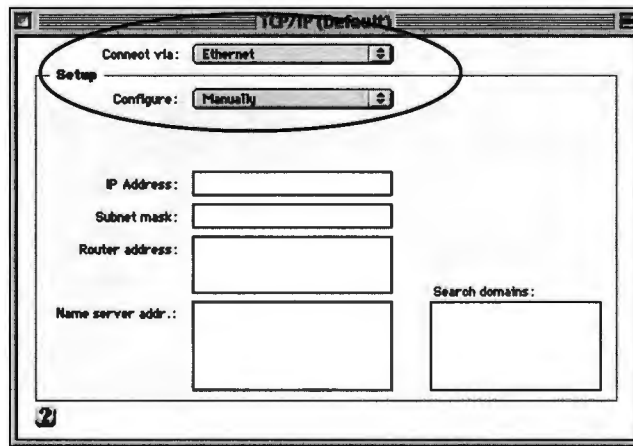
- your computer's IP address (e.g., "38.247.58.200")

- your network's subnet mask (e.g., "255.255.255.0")
- your network router's IP address (e.g., "38.247.58.1")
- your network Domain Name Server's (DNS) IP address (e.g., "38.247.58.2")
- your network's domain name (such as "mysite.com")

The numbers above are not the actual numbers used on your network. Obtain the correct ones from your administrator. You may then use the information as directed to configure the TCP/IP control panel. For example, if your network administrator tells you to configure the TCP/IP control panel manually for Ethernet, you do it like this:

**Connect via.** Choose an interface in the **Connect via** pop-up menu. In this example, **Ethernet**.

**Configure.** Choose the configuration method in the **Configure** pop-up menu—in this example, **Manually**.



---

FIGURE 8-4: Choosing connection and configure options.

**IP Address.** Type a number into the **IP Address** field—for example, "38.247.58.200."

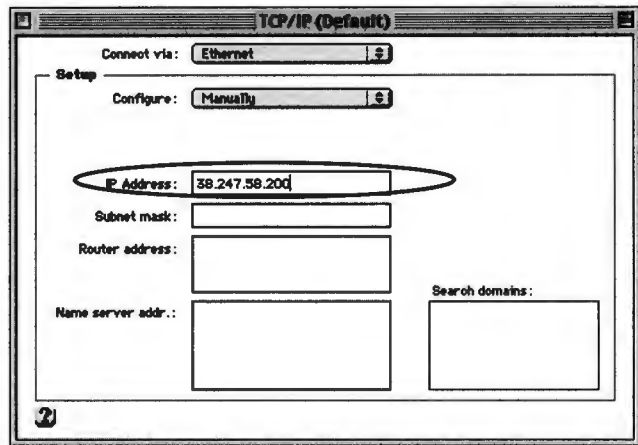


FIGURE 8-5: Entering an IP address.

**Subnet mask.** Type a number into the **Subnet mask** field—for example, "255.255.255.0."

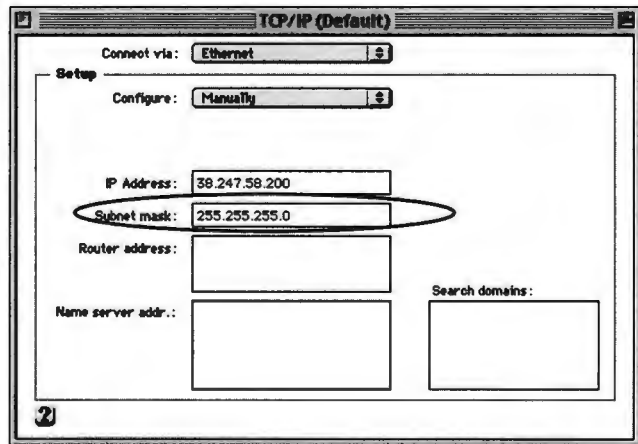
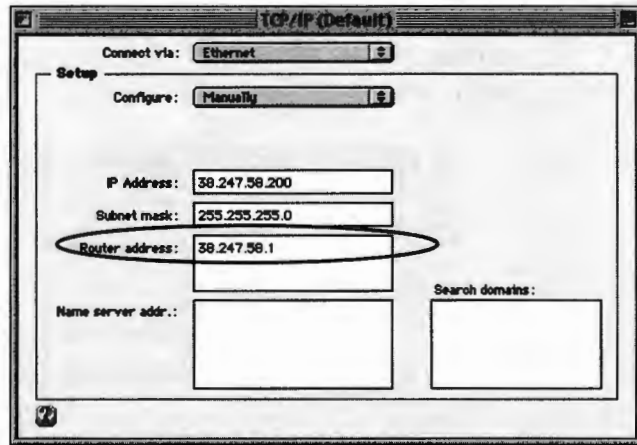


FIGURE 8-6: Entering a subnet mask.

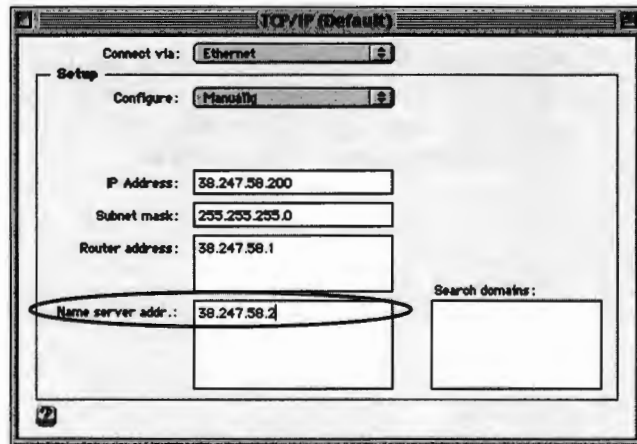
**Router Address.** Type a number into the **Router Address** field—for example, "38.247.58.1."



---

FIGURE 8-7: Entering a router address.

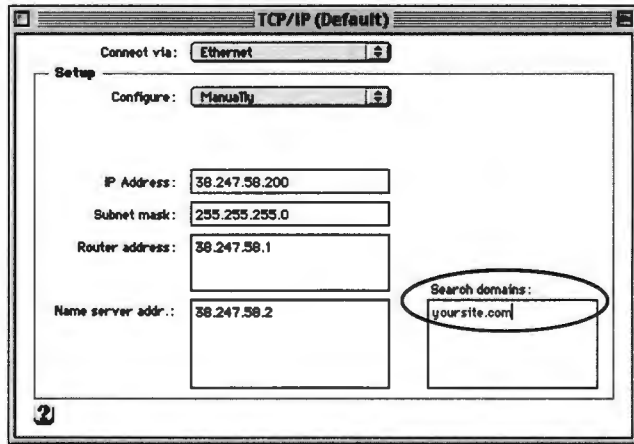
**Name server address.** Type a number (or numbers) into the Name server addr. field—for example, “38.247.58.2.”



---

FIGURE 8-8: Entering a name server address.

**Search Domains.** Type one or more domain names into the **Search domains** field—for example, “yoursite.com.” Close the TCP/IP control panel when you have finished, saving your changes when prompted.



---

FIGURE 8–9: Entering a domain name.

A good way to test the new configuration is to use your Web browser to log on to your AppleShare IP server, if Web services are available. Alternatively, you may log on to another host, such as <http://www.apple.com>, if you are connected to the Internet.



---

FIGURE 8–10: Visiting the Apple Web site to test configuration (Microsoft Internet Explorer).

## INSTALLING THE APPLESHARE IP CLIENT

Communications with any AppleShare or Personal File Sharing server require the *AppleShare client*. The most visible part of the AppleShare client is the *Chooser* extension, which you must click on in order to browse the list of network servers. Open the *Chooser* by selecting the **Chooser** item under the **Apple (🍏)** menu bar item.



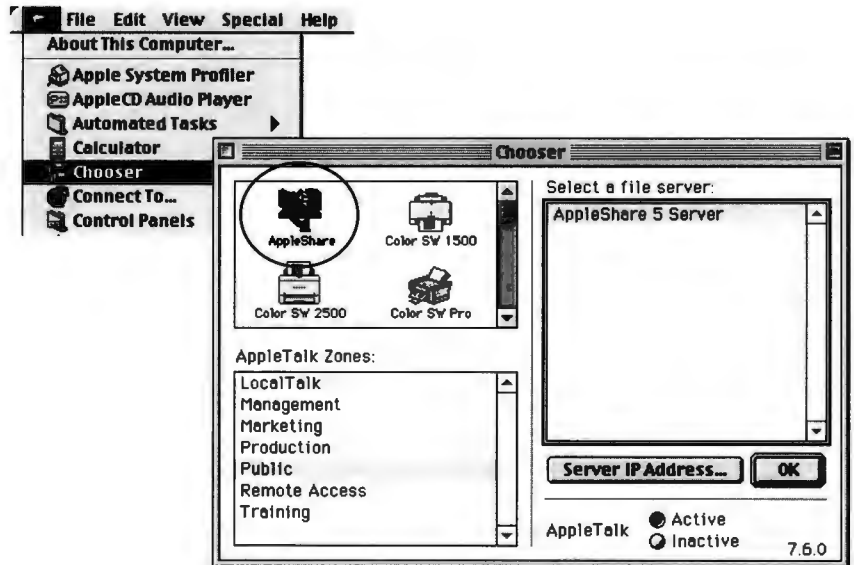


FIGURE 8–11: Opening the Chooser (AppleShare selected).

The AppleShare icon will be in the upper left of the Chooser window. Earlier versions of AppleShare client presented this icon:



Modern versions present this icon:

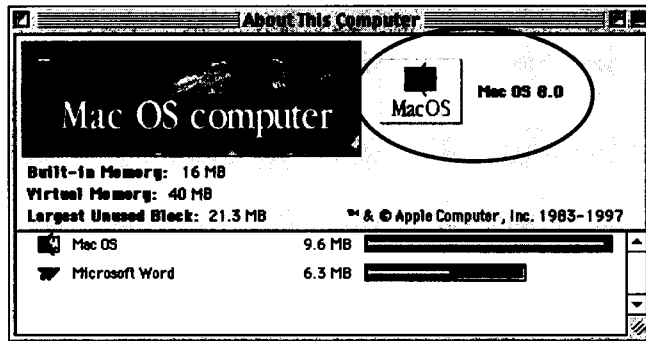


## Necessary Items for Installation

AppleShare IP is compatible with the earlier versions, so either client will work for logging on to the server over AppleTalk. However, to take advantage of new AppleShare IP features such as TCP/IP log-ons, you will need the following installed on your Mac OS computer.

### System 7.5.3 or Later

You can determine the OS version of a Mac OS computer by choosing **About This Computer** under the **Apple ()** menu bar item. (If you see an **About This Macintosh** item instead, the OS version is older than System 7.6.)



---

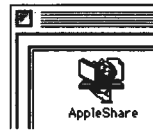
FIGURE 8-12: Determining the Mac OS system version.

### Open Transport 1.1.2 or Later

To determine what networking components a Mac OS computer is using, look in the **Control Panels** folder under the **Apple ()** menu bar item. If you see a **TCP/IP** or **AppleTalk** control panel, the computer is using Open Transport. Open one of these control panels; then choose the **Get Info** command from the **File** menu bar item to find out what version is being used.

## AppleShare Client 3.7 or Newer

To see if you already have a version of the AppleShare IP client on your computer, look in the Chooser. If you see the modern icon, then a newer version of AppleShare client has already been installed.



Computers using Mac OS 8 and later already have a modern AppleShare client. Contact your administrator to find out if there are any newer versions that you should be using.

## Network Installation

The AppleShare IP client can be installed from floppy diskettes or a CD-ROM, but the easiest way is from the AppleShare IP server itself. Ask your administrator if the AppleShare IP client is available for network installation. If so, ask:

- What is the name of the AppleShare IP server?
- What zone is it in (if applicable)?
- What user name should I use?
- What password should I use?
- What volume should I use?

Once you have this information, you can complete the following steps.

### Choose Server

Open the Chooser and select the AppleShare icon in the upper left of the window.

If your network is divided into zones, these will be listed in the lower left of the window. (If not, there will be no list in the Chooser.) Here, select the zone specified by your administrator.

All AppleShare file servers in the zone you have chosen will appear in the upper right of the window. Select the name of the file server specified by your administrator here, and press the **OK** button. This will open a log-on dialog box.

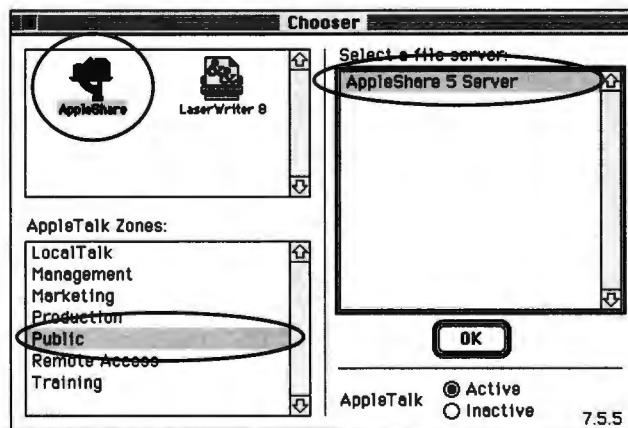
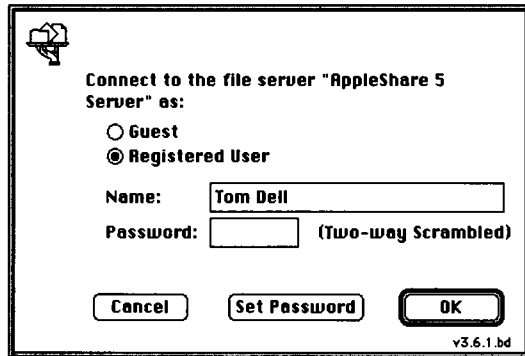


FIGURE 8-13: Locating a file server.

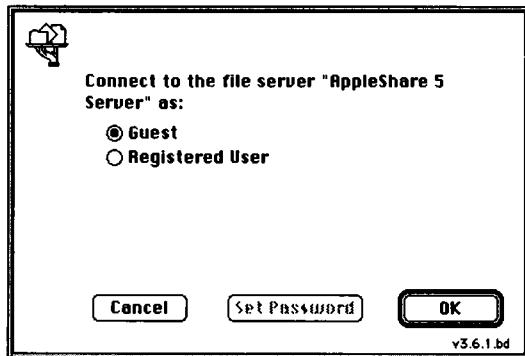
## Log On

Whatever name has been entered in the File Sharing control panel (the Sharing Setup control panel on pre-Mac OS 8 systems) is what will appear in the **Name** field. Type the user name and the password specified by your administrator here. If your server permits “guest access,” you may select the **Guest** button instead.



---

FIGURE 8-14: Logging on to an AppleShare server with name and password.



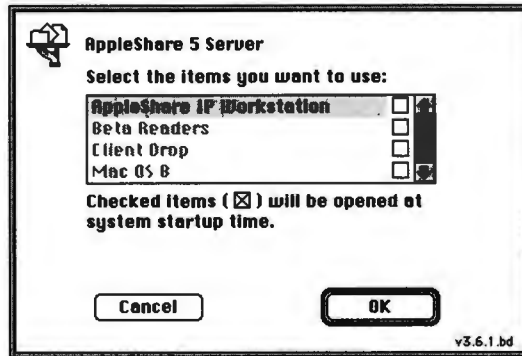
---

FIGURE 8-15: Logging on to AppleShare as a guest.

Press the **OK** button when you have finished. This will open a volume list window.

## Choose Volume

Click on the volume that contains the AppleShare Client software, as specified by your administrator, but do not enable the checkbox next to it. When you have done this, press the **OK** button. You will see the volume appear on your desktop. You may then close the Chooser.

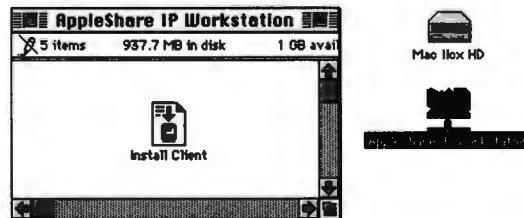


---

FIGURE 8-16: Selecting the server volume.

## Run Installer

Once a server volume has been *mounted* on the desktop, you may access its contents as you would any hard disk on your computer. Double-click on its icon to open it.



---

FIGURE 8-17: Opening the mounted volume.

Open any folders specified by your administrator to find the "Install Client" document. Double-click on this to launch the installer. This will open a dialog box that contains a license agreement. Read the agreement, and, if you agree to its terms, press the **Agree** button. This will open the Installer window.

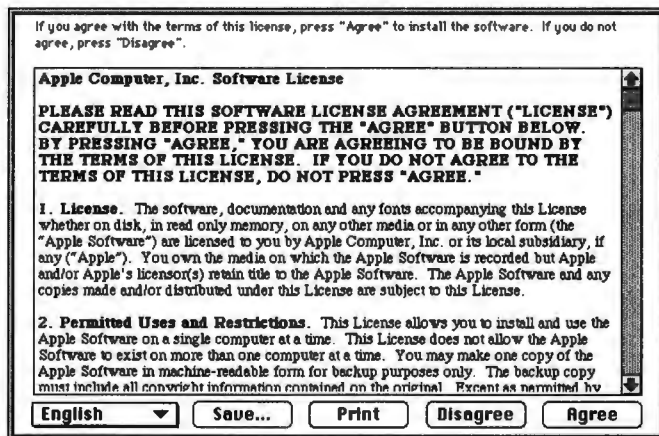


FIGURE 8-18: Reading the license agreement.

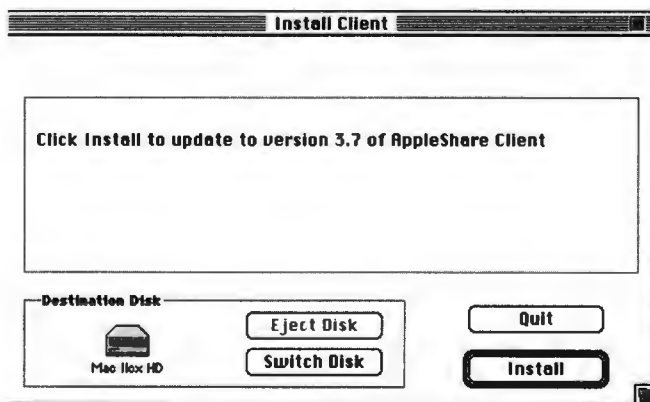


FIGURE 8-19: Viewing the installer window.

Make sure that your computer's startup disk is named in the Destination Disk section. If it is not, press the **Switch Disk** button until it is. Press the **Install** button when you have finished. The Installer will tell you when installation is complete. You will then need to **Restart** your computer.

# CONNECTING WITH APPLESHARE IP CLIENT

To access the files and applications stored on your network's servers, you must ask your administrator the following:

- What is the AppleTalk name of my AppleShare server?
- What AppleTalk zone is it in (if applicable)?
- What is the hostname of my AppleShare IP server? or
- What is the IP address of my AppleShare IP server?
- What user name should I use?
- What password should I use?
- What volume(s) should I use?

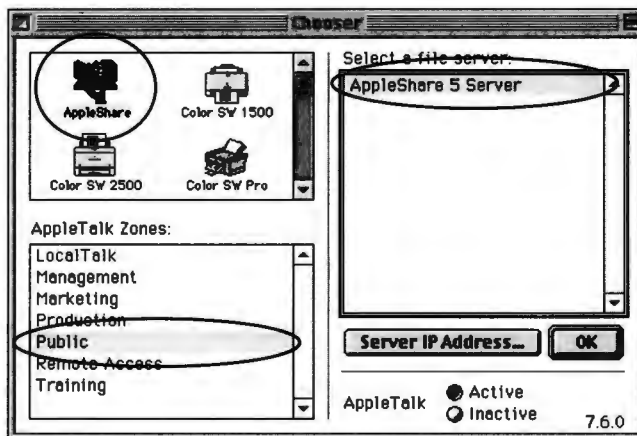
## Connection Steps

Once you have the above information, you can complete the following steps.

### Choose Server

Open the Chooser and select the AppleShare icon in the upper left of the window. Select your zone (if applicable) in the lower left; select your file server in the upper right.





---

FIGURE 8-20: Locating a file server.

A file server might appear in more than one zone. It is best to use the server that is in the same zone as your own computer (as displayed in the **Current zone** pop-up menu in the AppleTalk control panel).

Press the **OK** button once you have finished.

## Log On

In the log-on dialog box, type your user name in the **Name** field and your password in the **Password** field. Note that only bullets appear when you type your password. That is so that anyone looking over your shoulder will not see it.

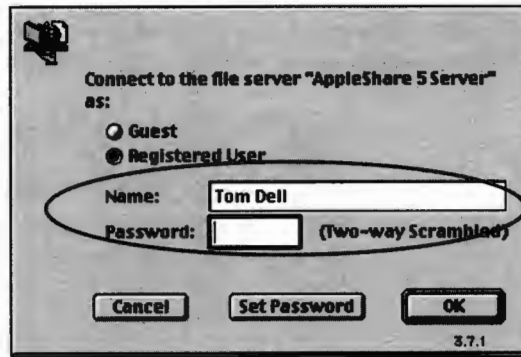


FIGURE 8-21: Logging on to AppleShare server with name and password.

**Establish owner name.** Your name might be in the **Name** field already. AppleShare takes this name from the File Sharing control panel (the Sharing Setup control panel on pre-Mac OS 8 systems). If you want this feature enabled, open the control panel and type the correct name in the **Owner Name** field before you log on to a server again.

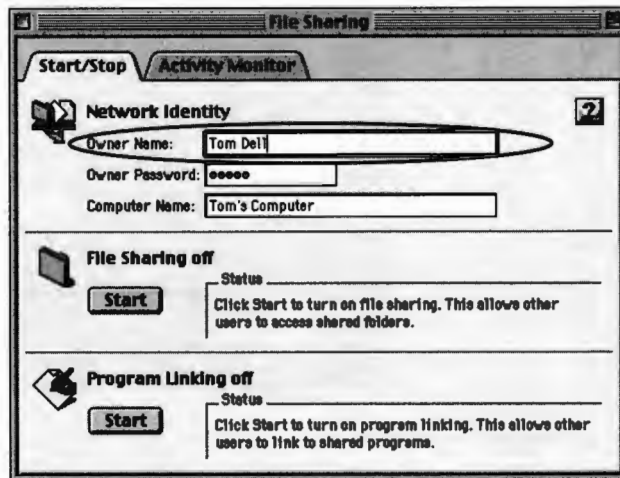


FIGURE 8-22: Entering an AppleShare user name as a Macintosh owner.

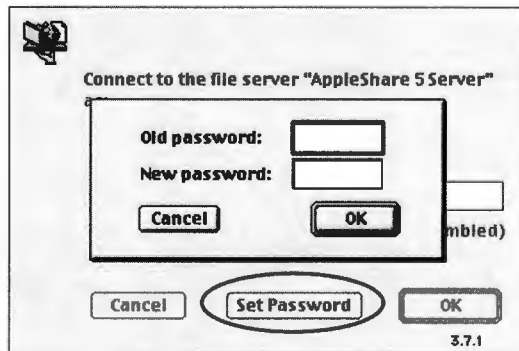
If your administrator tells you to use “guest access,” you may select the **Guest** button instead of supplying a registered user name and password. Press the **OK** button when you have finished.



---

FIGURE 8-23: Logging on to AppleShare as a guest.

**Set Password.** In some cases, you might be informed that your password has expired and that you must change it. You do so at any time by pressing the **Set Password** button.

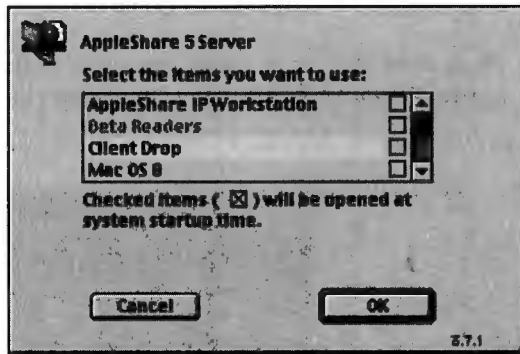


---

FIGURE 8-24: Setting a new password.

## Choose Volume

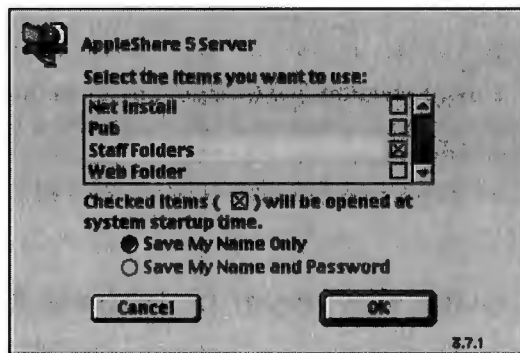
In the shared item window, click on the volumes that contain the files you wish to work with. Only those listed in dark type are available to you. Your access is restricted from those grayed out.



---

FIGURE 8-25: Selecting the server volume.

**Connect at startup.** If you will be working with a volume regularly, you will save time when you first start up your computer by logging in to it automatically. To permit this, enable the checkbox next to that volume.



---

FIGURE 8-26: Enabling automatic log-on.

Now you have two more choices. If you select the **Save My Name Only** button, you will still be prompted to enter your password when the computer starts up. If you select the **Save My Name and Password** button, you will not be prompted for any log-on information and the volume will be automatically mounted on the desktop. Because this could pose security risks, your administrator might have disabled the second option, in which case it will appear in gray.

Press the **OK** button when you have finished. When you see the volume appear on your desktop, you may close the Chooser.



FIGURE 8-27: Opening a mounted server volume.

This connection has traditionally been made via the AppleTalk networking protocol. However, the AppleShare IP client uses the faster TCP/IP networking protocol instead. It will use AppleTalk only if TCP/IP is not configured for use by your computer and/or the server.

## Using the Server IP Address Button

If AppleTalk is not active on your computer, or if you are trying to connect to a file server over a network on which AppleTalk is not used, the server will not appear in the Chooser. Instead, press the **Server IP**

**Address** button in the lower right of the window to open the Server Address dialog box. Type the server's hostname or IP address here, then press the **Connect** button.

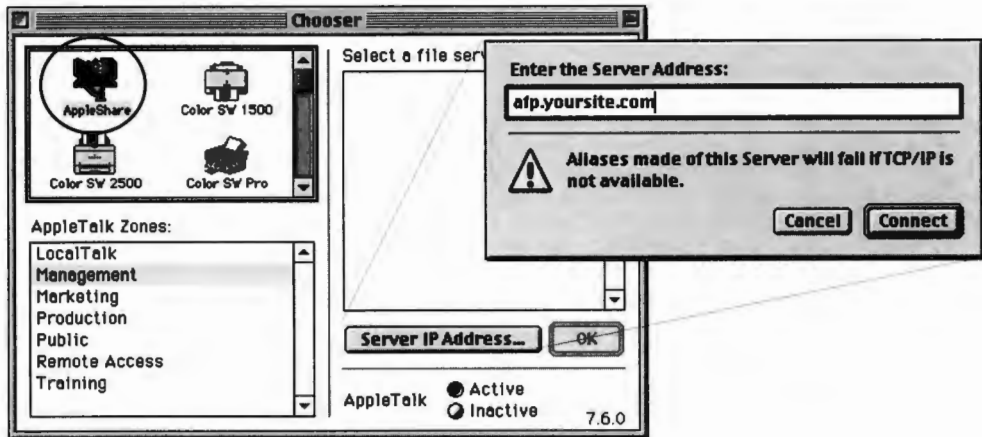


FIGURE 8-28: Entering the address for the file server.

## Beware of Multihoming

Multihoming permits the server to make its shared volumes available in more than one zone at the same time. This feature is a convenience, but it can also pose a danger. Be careful when connecting to volumes that have the same name but appear in different zones. It may be that they are actually the *same* volume that is located on a multihoming server. If you log on to the same server in two different zones and then attempt to copy the same files from one zone's volume to the other's (actually the same volume mounted twice), you will lose data!

## Re-connecting with Aliases

You can save yourself the effort of opening the Chooser for each log-on by making an alias of any network volume on your desktop. To do this,

select the server volume and choose the **Make Alias** command from the **File** menu bar item.



The next time you want to log on to that volume, simply double-click on the alias. You might be prompted to enter your user name and password, but you will bypass all other steps.

The Mac OS will also create aliases for you automatically. To enable this, make sure that the **Remember recently used items** checkbox is selected in the **Apple Menu Options** control panel, and that there is a number in the **Servers** field. You can open this control panel by choosing it in the **Control Panels** folder accessible under the **Apple ()** menu bar item.



---

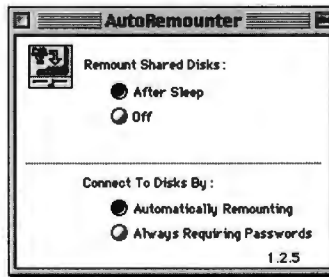
FIGURE 8–29: Remembering server volumes.

If this feature is enabled, then the Mac OS will make an alias of each server volume that you mount and save it in the “Recent Servers” folder in the “Apple Menu Items” folder within the System Folder. To mount

any one of these volumes again, simply choose its name in the fly-out menu of the **Recent Servers** item under the **Apple ()** menu bar item.

## Re-connecting with AutoRemounter

If you have a PowerBook or an Energy Saver-equipped computer that “sleeps,” you may lose your server connection whenever it powers down. However, you do not necessarily have to log on again when the computer awakes. The AutoRemounter control panel will do it for you. Simply make sure that the **After Sleep** button is selected in the control panel. You can open the control panel by choosing it in the **Control Panels** folder accessible under the **Apple ()** menu bar item.



---

FIGURE 8–30: Enabling AutoRemounter.

If you are concerned about someone using your computer to access the server when you are away, select the **Always Require Passwords** button so that access will be less direct.

## Working with Mounted Volumes

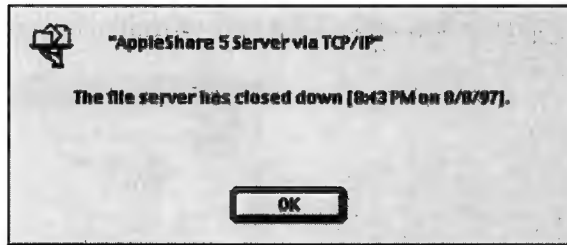
When you mount a volume on your desktop, you have access to a hard disk, or a folder on a hard disk, that is connected to the server. This volume can be used in the same way you use any hard disk that is physically attached to your computer. You may copy files from the volume and back to it; you may launch applications that reside on it; and you may delete



files from the volume by dragging them to the Trash and emptying it. The only difference you will notice is that reading data over a network is slower than reading it from a local hard disk.

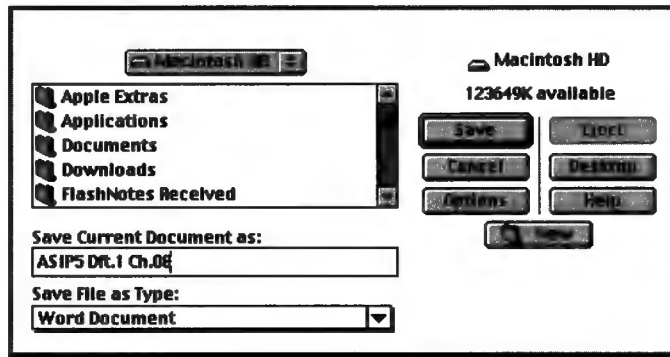
To disconnect from the AppleShare server, drag the server volume icon to the Trash. This will not delete any files on the volume. When you shut down the computer, you are disconnected automatically. Also, the AppleShare administrator can disconnect you using the AppleShare file server software if necessary.

On occasion, you may be disconnected because of a network or file server failure. In that case, you will be warned with a dialog box:



If you were running an application that resides on the mounted volume that was disconnected, all of your unsaved work may be lost. For this reason it is wise to run applications from your local hard disk, and not from the server, whenever possible.

If you were working on a document that resides on the mounted volume that was disconnected, your work will not *necessarily* be lost. That document and your recent changes to it should still be present in your computer's memory. To preserve them, use the **Save as** command under the application's **File** menu bar item to save the document to your computer's hard disk.



---

FIGURE 8-31: Using the Save As command.

## Connecting from a Remote Location

If you have a PowerBook or a Mac OS home computer and you wish to connect to your AppleShare server from a remote location, you have several options.

### AppleTalk Remote Access Version 2

AppleTalk Remote Access (ARA) software uses a special AppleTalk Remote Access Protocol (ARAP) to connect two Mac OS computers over telephone lines. To take advantage of this service, your network must have an ARA server for your computer to call using a modem. If your administrator confirms that this service is available and that your user account has been enabled to use it, you will also need to know what telephone number your computer must dial to connect.

To use ARA, first select the **Remote Only** item in the AppleTalk control panel's **Connect via** pop-up menu.

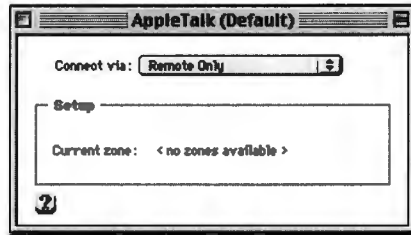


FIGURE 8-32: Enabling Remote Only AppleTalk access.

Note that no zones are listed while you are off-line. When you have logged on to the ARA server, you may find that the zone in which your remote computer resides is not the same as the one that your desktop computer is in, or that the AppleShare server is in.

Next, launch the Remote Access Client application, usually found in the "Remote Access Client Folder" inside the "Apple Extras" folder. This software permits you to create connection documents, which you configure with your AppleShare user name and password and the telephone number for the ARA server.

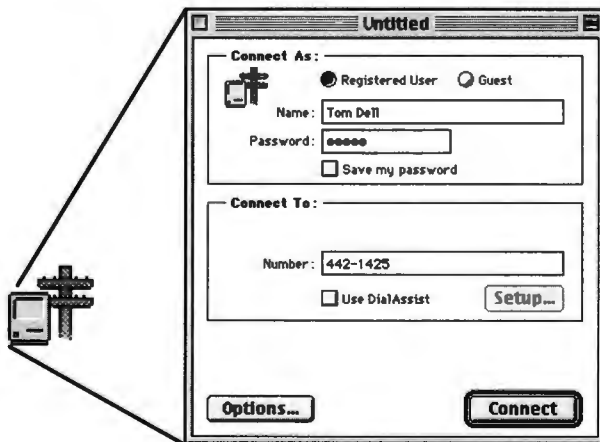
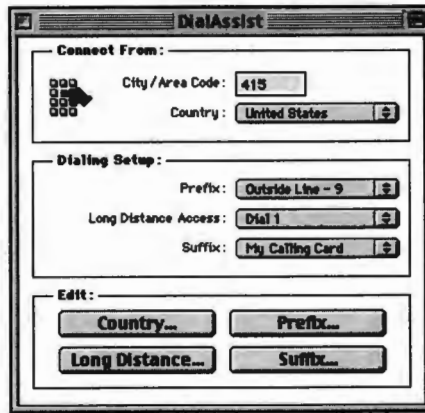


FIGURE 8-33: Configuring an ARA document.

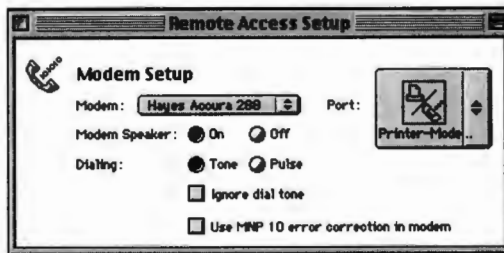
If you are dialing in from far away or from a hotel room, the DialAssist control panel can help you by adding dialing codes (e.g., 1-, 9-, etc.) and area codes automatically. You can also configure it to permit each call to be billed to a calling card or credit card. Enable this by selecting the **Use DialAssist** checkbox and pressing the **Setup** button that becomes active.



---

FIGURE 8-34: DialAssist control panel.

Next, select the **Remote Access Setup** command under the **Setup** menu bar item. In the Remote Access Setup window, you must select your modem type and the port to which it is connected.



---

FIGURE 8-35: Selecting the modem.

Press the **Connect** button when you have finished configuring an ARA document. Once connected, you may use AppleTalk network services as

if you were connected directly to the network. For example, you can print, log on to file servers, or check your email. The only difference is that each transaction will be slower.

You can quit the ARA client application once you are connected. When you want to log off, select the **Remote Access Disconnect** item under the **Apple** (🍏) menu bar item.

To save time in future log-ons, make an alias of a server volume that you will connect to remotely. When you double-click on the alias, ARA will be launched automatically and will dial in to make the connection.

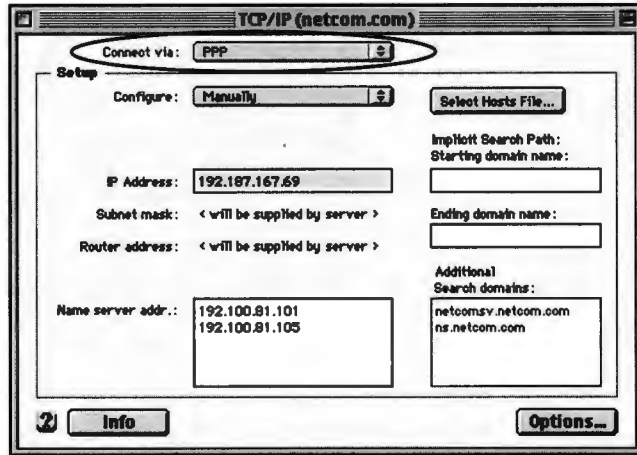
ARA version 2 was designed to give you remote access to AppleTalk-based network resources such as printing and AppleShare and Personal File Sharing. It was not designed to provide access to TCP/IP-based services directly, such as the AppleShare IP Web & File Server or Internet email. These services can be provided if your network is equipped with the Apple IP Gateway. Contact your administrator to determine if this is a possibility.

## Open Transport/PPP

If your network has an AppleShare IP server, you might be able to log on to it via the Internet. This will not give you access to AppleTalk-based services such as AppleShare, Personal File Sharing, printing, or some email systems, but it will give you access to the AppleShare IP Web & File Server and Internet email. Contact your administrator to determine if your network is accessible via the Internet.

To make this possible you should have an Internet Service Provider (ISP) that permits dial-up access to the Internet using the Point-to Point Protocol (PPP). This protocol does for TCP/IP what ARA does for AppleTalk. It can be used if your computer is running System 7.5.3 or newer and Open Transport.

If you have System 7, you might need the free Open Transport/PPP software from Apple. It must be installed after Open Transport TCP/IP. Once installed, it makes a new option available to you in the **Connect via** pop-up menu: **PPP**.

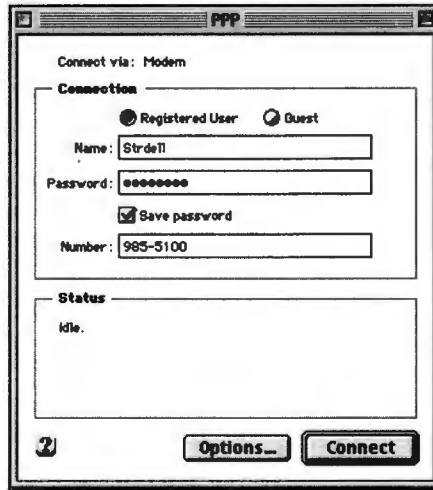


---

FIGURE 8-36: Configuring the TCP/IP control panel for PPP.

Configure the TCP/IP control panel according to the instructions of your ISP.

Next, open the **PPP** control panel from the **Control Panels** item under the **Apple (🍏)** menu bar item. Here enter your user name, password, and the phone number of your ISP's PPP server.



---

FIGURE 8-37: Configuring the PPP control panel.

Press the **Connect** button to open the connection. Once you are logged on to the Internet, you may gain access to your network's AppleShare IP Web & File Server and Mail Server.

In addition to MacPPP and Apple's Open Transport/PPP, you may be able to use other applications possibly supplied to you by your ISP, such as FreePPP, MacPPP, or MacSLIP. These are configured in much the same way. Follow the instructions that accompany them for specifics.

## AppleTalk Remote Access Version 3

Later versions of System 7 shipped with ARA version 2. At about the same time that Mac OS 8 was released, Apple began shipping ARA version 3. The newer version can connect with servers using the traditional ARAP or the Internet-standard PPP. Contact your administrator to determine if your network is equipped to permit access via ARA version 3.

## Using Location Manager

If you have a PowerBook and regularly move between two or more locations, such as home and office, you will find a time-saver in Apple's Location Manager. This control panel permits you to set up profiles of multiple locations that include your network settings.

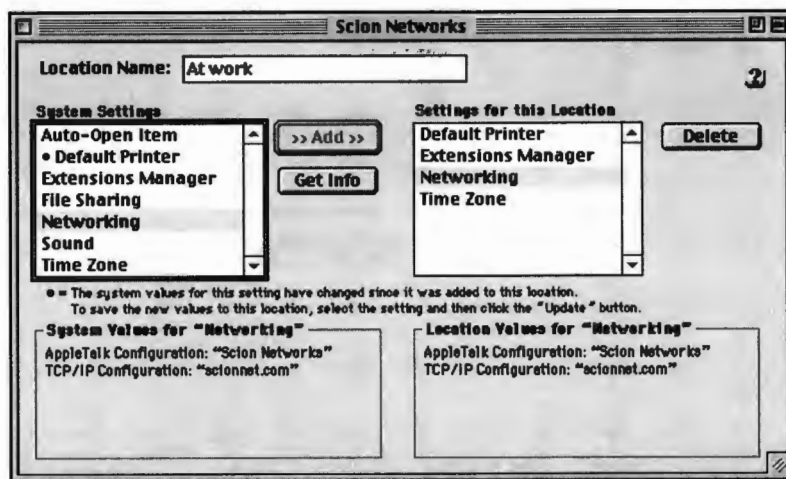
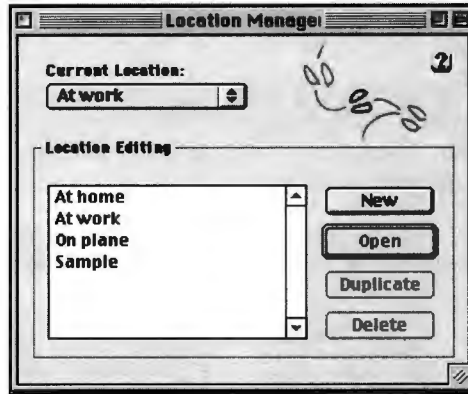


FIGURE 8-38: Choosing settings to remember in profile.

When you change locations, all you need to do is switch profiles to go on-line without further configuration changes. This software is compatible with System 7.6 and newer, and ships with Mac OS 8.





---

FIGURE 8-39: Changing configuration for a different location in Location Manager.

## WORKING WITH ACCESS PRIVILEGES

One way to control access to the files on your computer's hard disk is by allowing or denying physical access to the machine. When files are stored on a public file server, however, another method must be used. AppleShare controls who will be given access to which shared volumes, and any folders and files within them, through *access privileges*.

Two access schemes are possible depending on the version of the Mac OS your computer uses.

### System 7 Access Privileges

Under System 7, the following privileges are possible:

**See Folders.** You may open a folder to see any other folders it contains.

**See Files.** You may open a folder, see the folders and files inside, and open those files.

**Make Changes.** You may open a folder, see the folders and files inside, and open, move, modify, delete, or write files.

Each access privilege can be applied singly or in combination to any folder, creating the possibility of several access levels. How you apply these combinations is important. The Make Changes privilege will let you delete a file, for example, but only if you have the See Files privilege to see it!

You need the following access privileges to perform the following tasks:

- Copy a file to a shared folder: **Make Changes.**
- Copy a file from a shared folder: **See Folders** and **See Files.**
- Copy a folder to a shared folder: **See Folders** and **Make Changes.**
- Copy a folder from a shared folder: **See Folders.**
- Create a file in a shared folder: **See Folders**, **See Files** and **Make Changes.**
- Create a folder in a shared folder: **See Folders** and **Make Changes.**
- Delete a file in a shared folder: **See Files** and **Make Changes.**
- Delete a folder in a shared folder: **See Folders** and **Make Changes.**
- Move a folder to another folder in a shared folder: **See Folders** and **Make Changes.**
- Move a folder from a shared folder: **See Folders** and **Make Changes.**
- Open and use a file in a shared folder: **See Files.**
- Save changes to a file in a shared folder: **See Files** and **Make Changes.**

AppleShare does not share individual files, so all access privileges apply only to a given file's enclosing folder.

## Viewing System 7 Access Privileges

Access privileges are set either by the AppleShare administrator or by an AppleShare user who has created a folder on a server volume. You can determine what your access privileges to a given folder are in one of the three ways explained in the following sections.

### *Folder icons.*



**Tabbed Folder.** This icon means that you are the owner of the folder and so have **See Folders**, **See Files**, and **Make Changes** privileges.



**Plain Folder.** This icon means that you do not own the folder, but you have some access privileges to it.



**Folder with Arrow.** This icon means that you have only **Make Changes** privileges. You can copy a file or folder to it, but you may not open it or see what is inside. This is called a “drop box.”



**Locked Folder.** This icon means that you have no access privileges to the folder.

**Directory windows.** When you open a folder, you can see which access privileges you have to the folders it contains by looking at the menu bar of the directory window.



**Crossed-out File.** This icon means that you are not allowed to see enclosed files.



**Crossed-out Folder.** This icon means that you are not allowed to see enclosed folders.



**Crossed-out Pencil.** This icon means that you are not allowed to write (save or copy) anything to the folder.



**Crossed-out Pencil/Crossed-out Folder.** These icons together mean that you are not allowed to write to or see folders.



**Crossed-out Pencil/Crossed-out File.** These icons together mean that you are not allowed to write to or see files.

**Sharing window.** You may also select a folder and choose the **Sharing** command from the Finder's **File** menu bar item. This will show you who owns the folder and what privileges have been granted either to you or to your Group.

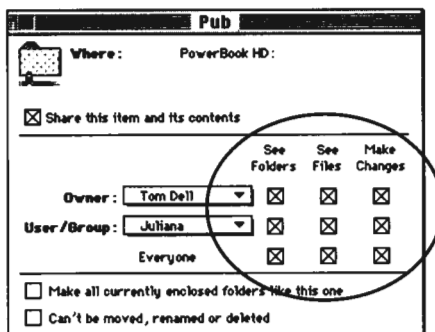


FIGURE 8-40: System 7 File Sharing access privileges.

## Assigning System 7 Access Privileges

If the AppleShare administrator has given you sufficient access privileges, you may create a folder and set your own privileges for it. To do this, select a folder that you own on a mounted volume and choose the **Sharing** command from the **File** menu bar item.

A window will appear. To access this shared folder, a user must fall into one of three categories:

**Owner.** This is you, the person who created the folder that is being shared.

**User/Group.** This can be one other individual if a user is selected, or several people if a group is selected.

**Everyone.** If a user is not specifically listed in the Owner or User/Group field, either directly or by group association, that user will not be allowed access to your folder unless you assign access privileges to this category. This makes the folder available to any other registered AppleShare users as well as to anyone else who logs on using the guest account, if guest access is permitted on your server. Before enabling access to this category, check with your AppleShare administrator to make sure that doing so does not violate policy.

**Owner :**

**User /Group :**

Everyone

Enable the checkboxes of the privileges you want to assign.

See Folders	See Files	Make Changes
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Select no checkboxes when you want to restrict access.

Everyone ☐ ☐ ☐

To ensure that no one can alter or throw away the folder, select the **Can't be moved, renamed or deleted** checkbox. To assign these same access privileges to all folders within the selected folder, enable the **Make all currently enclosed folders like this one** checkbox.

- ☒ Make all currently enclosed folders like this one
- ☒ Can't be moved, renamed or deleted

If you want the folder you have created to have the same access privileges as the folder in which it is contained, just enable the **Same as enclosing folder** checkbox.

- ☒ Same as enclosing folder

## Transferring System 7 Access Privileges to AppleShare IP

The See Folders, See Files, and Make Changes access privileges that AppleShare and System 7 use are not the same as the access privileges AppleShare IP and Mac OS 8 use. As a result, you can enable access privilege combinations on a System 7 machine that will not actually take effect on an AppleShare IP server! Those that will are:

- **See Folders and See Files.**
- **See Folders, See Files, and Make Changes.**
- **Make Changes.**

## Mac OS 8 Access Privileges

Under Mac OS 8, the following privileges are possible:



**Read & Write.** You may open a shared folder to see what folders and files it contains; you may copy folders and files to and from the shared folder; and you may open, create, move, modify, and delete folders and files within the shared folder.



**Read Only.** You may open a shared folder to see what folders and files it contains; you may copy folders and files from the shared folder; and you may open folders and files within the shared folder.



**Write Only.** You may only copy folders and files to the shared folder. A folder with such access privileges is commonly called a “drop box” because you can copy data into it but you cannot open it to see what else is inside.



**None.** You may not open the shared folder to see what is inside, or copy folders and files to or from it.

These access privileges are not used in combination, so assigning them is easier. Here are the privileges necessary to perform the following tasks:

- Copy a file to a shared folder: **Read & Write** or **Write Only**.
- Copy a file from a shared folder: **Read & Write** or **Read Only**.

- Copy a folder to a shared folder: **Read & Write** or **Write Only**.
- Copy a folder from a shared folder: **Read & Write** or **Read Only**.
- Create a file in a shared folder: **Read & Write**.
- Create a folder in a shared folder: **Read & Write**.
- Delete a file in a shared folder: **Read & Write**.
- Delete a folder in a shared folder: **Read & Write**.
- Move a folder to a folder in a shared folder: **Read & Write** or **Write Only**.
- Move a folder from a shared folder: **Read & Write**.
- Open and use a file in a shared folder: **Read & Write** or **Read Only**.
- Save changes to a file in a shared folder: **Read & Write**.

AppleShare does not share individual files. All access privileges apply only to a given file's enclosing folder.

## Viewing Mac OS 8 Access Privileges

Access privileges are set either by the AppleShare administrator or by an AppleShare user who has created a folder. You can determine what your access privileges to a given folder are in one of three ways:

### *Folder icons.*



**Tabbed Folder.** This icon means that you are the owner of the folder, and so have **Read & Write** privileges.

**Plain Folder.** This icon means that you are not the owner of the folder, but you have some access privileges to it.

**Folder with Arrow.** This icon means that you have just **Write Only** privileges to the folder. You can copy a file or folder to it, but may not see what is inside. This is called a “drop box.”

**Locked Folder.** This icon means that you have no access privileges to the folder.

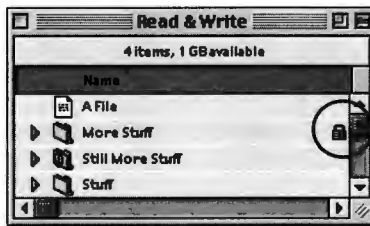
**Directory windows.** When you open a folder, you can see which access privileges you have to its folders by looking at the title bar of the directory window.



**Crossed-out Pencil.** You are not allowed to write (save or copy) anything to the folder.



**Lock.** The folder is locked (cannot be moved, renamed, or deleted).



**Lock/Crossed-out Pencil.** You are not allowed to write to the folder, and the disk is locked (cannot be moved, renamed, or deleted).

**Sharing window.** You may also select a folder and choose the **Sharing** command from the Finder's **File** menu bar item. This will show you who owns the folder and what privileges you or the group you belong to have.

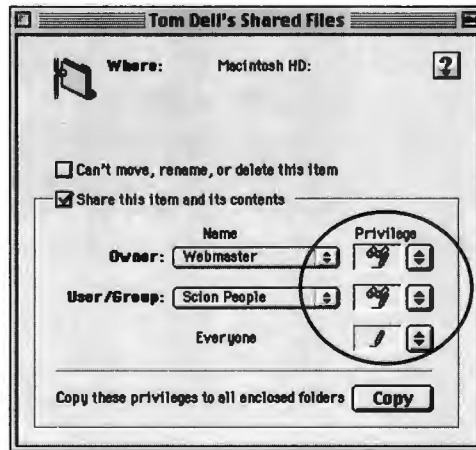


FIGURE 8-41: Mac OS 8 File Sharing access privileges.



## Assigning Mac OS 8 Access Privileges

If the AppleShare administrator has given you sufficient access privileges, you may create a folder and set your own privileges for it. To do this, select a folder that you own on a mounted volume and choose the **Sharing** command from the **File** menu bar item.

A window will appear. To access the shared folder, a user must fall into one of three categories:

**Owner.** This is you, the person who created the folder that is being shared.

**User/Group.** This can be one other individual if a user is selected, or several people if a group is used.

**Everyone.** If a user is not specifically listed in the Owner or User/Group field, either directly or by group association, that user will not be allowed access to your folder unless you assign access privileges to this category. This makes the folder available to any other registered AppleShare users as well as anyone who logs on using the guest account, if guest access is permitted on your server. Before enabling access to this category, check with your AppleShare administrator to make sure that it is safe to do so.

The image shows a screenshot of a Mac OS 8 Access Privileges window. It has a light gray background. At the top, the word "Name" is centered. Below it, there are three rows of text. The first row is "Owner:" followed by a text box containing "Tom Dell". The second row is "User/Group:" followed by a text box containing "You". The third row is "Everyone" without a text box.

	Name
<b>Owner:</b>	Tom Dell
<b>User/Group:</b>	You
	Everyone



The **Privilege** pop-up menus enable the access levels you want to assign. Use "none" in the pop-up menu to disallow any access. Select the **Can't move, rename or delete this item** checkbox to ensure that no one can alter or throw away the folder. To assign these same access privileges to all folders within the selected folder, press the **Copy** button.

Everyone



☒ Can't move, rename, or delete this item

Copy these privileges to all enclosed folders

**Copy**

If you want the folder you have created to have the same access privileges as the folder that contains it, just enable the **Use enclosing folder's privileges** checkbox.

☒ Use enclosing folder's privileges

## USING PERSONAL FILE SHARING

Depending on the rules governing your network's usage, you may be able to share folders from your hard disk in the same way the AppleShare file server does. This has been possible since the release of System 7 with Personal File Sharing.

### Working with Personal File Sharing

Personal File Sharing works in the same manner as an AppleShare file server, although it is not as robust.

#### Personal File Sharing Limitations

Connected users	10
Outstanding requests	5
Open files	346
Simultaneous launches	10
Physical volumes	10
Physical volume size	4 Gbytes
File size	2 Gbytes
Shared items	10
Users in Users & Groups Data File	100
Groups in Users & Groups Data File	100
Group memberships per user	41
TCP Access	No
Web Access	No

## Create Shared Folder

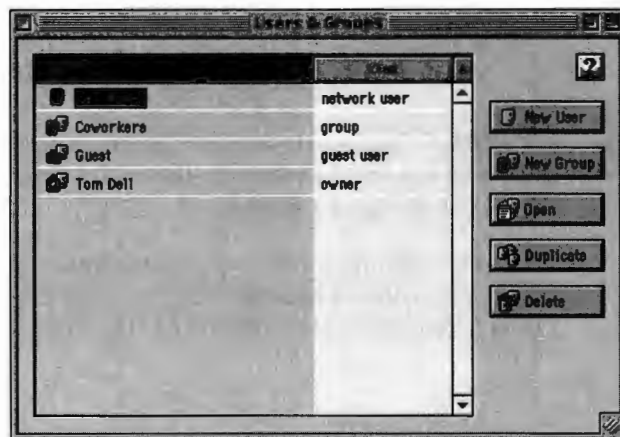
Before you enable Personal File Sharing, it is best to create one folder that will contain all of the files that you want to share with others on your network (e.g., “My Shared Files”). You can share your entire hard disk, but this is a bad idea because it might leave your private files and system software open to tampering.



My Shared Files

## Create Users and Groups

Because it is assumed that you do not want to share the data on your hard disk with just anyone, the Mac OS uses a system of password-protected user and group accounts to restrict access to certain people. Your AppleShare administrator is responsible for establishing user and group accounts on the AppleShare server. You may create similar accounts for access to your personal computer. To do this, choose the Users & Groups control panel from the **Control Panels** folder accessible under the **Apple** () menu bar item.



---

FIGURE 8-42: Creating users and groups.

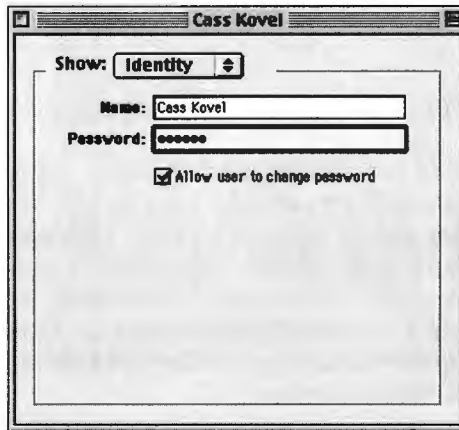
Four types of accounts can be used to share items on your hard disk.



**Owner.** This is your account, as you are the owner of the computer. It is created automatically under the name that is typed in the **Owner Name** field of the File Sharing control panel (the Sharing Setup control panel under System 7). This account gives you full control over the folders on your computer when you log on from another machine, such as a home computer.



**User.** Each user account includes a name for an individual to whom you wish to grant access. For security, it can also include a password. You can create a user account by pressing the **New User** button.



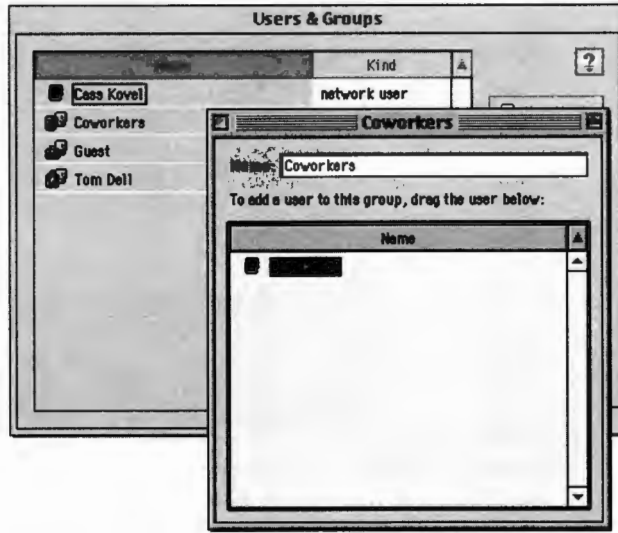
---

FIGURE 8-43: Creating a new user.



**Groups.** Each shared folder can be shared with one other person via a user account. If you want to share with multiple users, you must make them part of a group account.

To create a group account, press the **New Group** button. In the window that opens, name the group; then drag the users you wish to add from the Users & Groups window to the Group window.



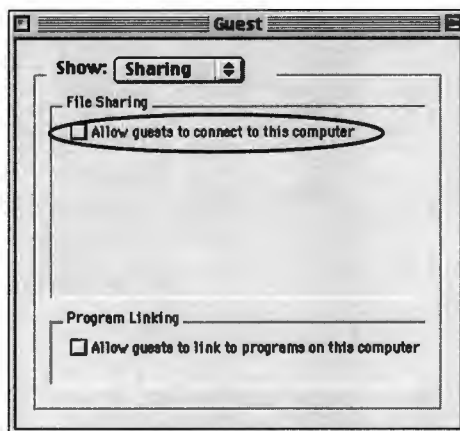
---

FIGURE 8-44: Creating a new group.



**Guest.** The guest account is special in that it does not provide the same security constraints of the user account. It permits anonymous users to log on to your computer, so use it only when there is no data in your shared folder that is private. Guests should usually be given limited access privileges (e.g., **Make Changes** or **Write Only**).

For maximum security, it is best to disable guest access by de-selecting the **Allow guests to connect to this computer** checkbox.

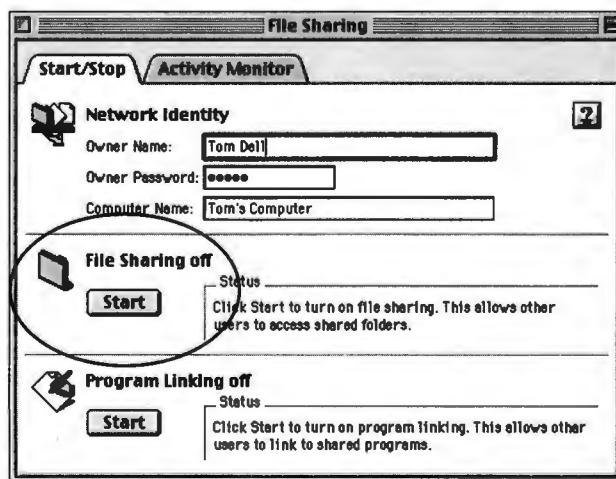


---

FIGURE 8-45: Disabling guest access.

## Enable File Sharing

After you have established users and groups, you may turn on File Sharing. To do this, open the File Sharing control panel (the Sharing Setup control panel under System 7), and press the **Start** button.



---

FIGURE 8-46: Turning on File Sharing.

## Share Folder

Just turning on File Sharing does not complete the process. You must designate which folder you want to share, which users and groups will have access to it, and with what access privileges.

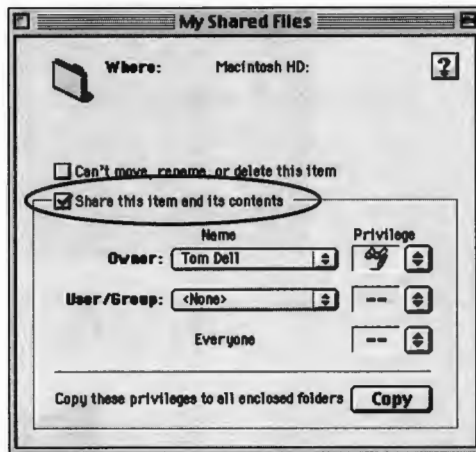
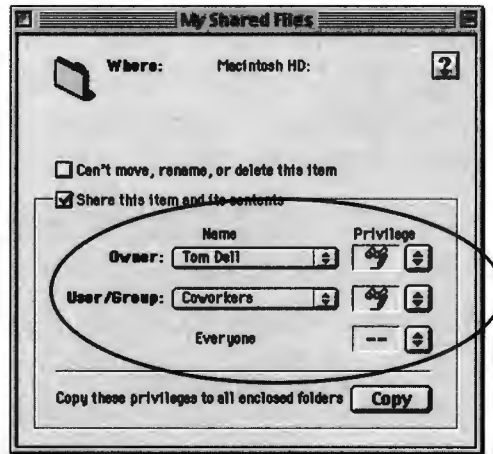


FIGURE 8-47: Sharing a folder.

It takes a few minutes for Personal File Sharing to start up. When it is on, select a folder that you wish to share and choose the **Sharing** command under the Finder's **File** menu bar item. In the window that this opens, select the **Share this item and its contents** checkbox. Close the window after you have assigned access privileges.





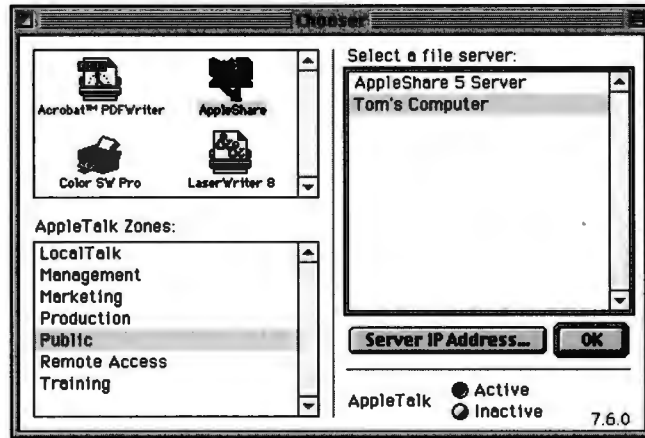
---

FIGURE 8–48: Folder ready for sharing.



The icon of the folder will change to show you that it is being shared. When a user logs on to the folder, the icon will change to reflect this as well. To a network user, your computer now appears in the Chooser just like any other AppleShare server.

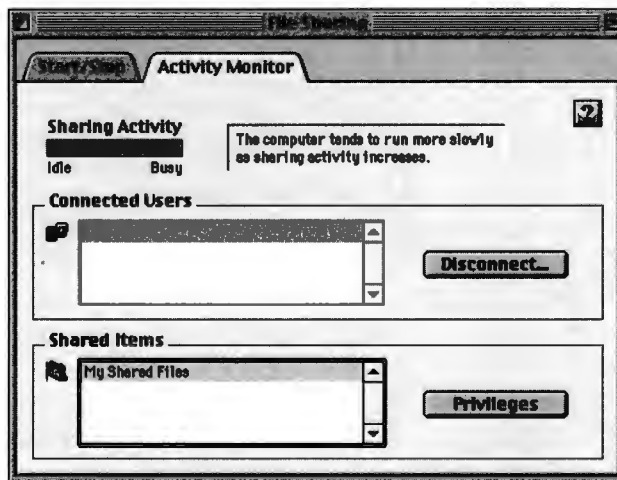




---

FIGURE 8-49: File sharing computer as seen in the Chooser.

You can see which users are logged on to your computer by opening the File Sharing control panel and pressing the **Activity** tab. (This function is performed by the File Sharing Monitor control panel under System 7).



---

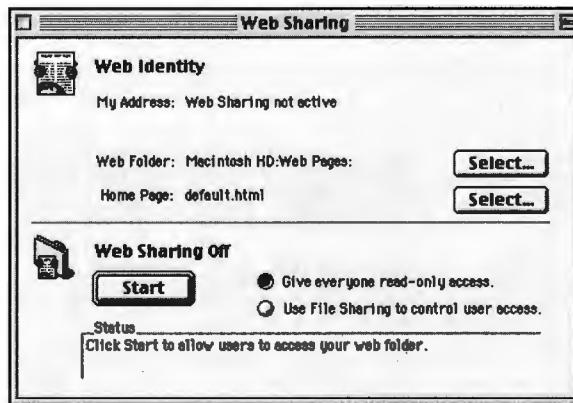
FIGURE 8-50: Viewing user activity.

If you wish to log off a user, press the **Disconnect** button. If you wish to change the privileges associated with a shared folder, press the **Privileges** button.

## USING PERSONAL WEB SHARING

Apple's Personal Web Sharing gives you the ability to host your own Web site from your Mac OS computer. It comes as a part of Mac OS 8.

To enable this feature, open the Web Sharing control panel from the **Control Panels** item under the **Apple ()** menu bar item.



---

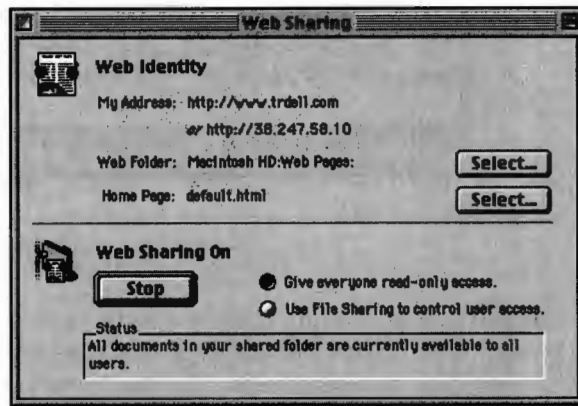
FIGURE 8-51: Enabling Personal Web Sharing.

In the Web Sharing window, use the topmost **Select** button to choose a folder that will contain your Web pages. By default, the Mac OS creates a "Web Pages" folder for this purpose. Next, use the second **Select** button to choose your home page, which must be placed in the designated Web Folder. This is the page browsers will first see when they visit your com-

puter. By default, the Mac OS places several sample pages in your Web Folder that can be used for initial testing.

Before you launch Web Sharing, you might ask your administrator to give your computer a hostname on the DNS server (e.g., “www.me.my.site.com”). This might be easier for visitors to remember than the IP address of your computer, but either will work.

You may try out your Web Sharing by pressing the **Start** button.



---

FIGURE 8-52: Turning Web Sharing on.

Give the address of your computer to other users who have a Web browser. They should now be able to log on to your computer and see Apple’s sample pages.



---

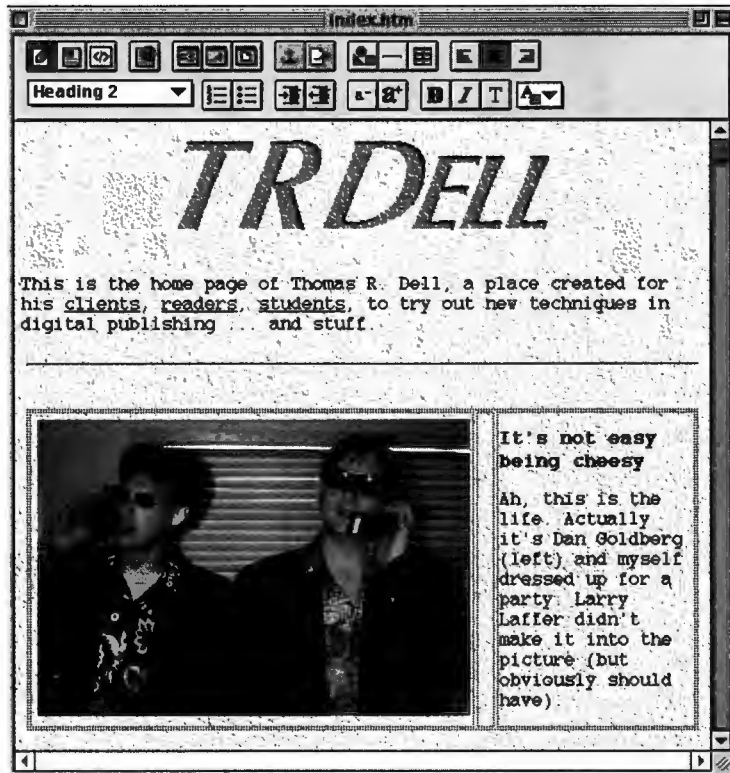
FIGURE 8-53: Viewing sample pages.

Personal File Sharing does not need to be running on your Macintosh, since Web Sharing is not dependent on it. If you want to restrict your Web site to network users only, however, you can use the same accounts that are used by Personal File Sharing if you select the **Use File Sharing to control user access** button. If you select the **Give everyone read-only access**, you will not have to worry about strangers uploading anything to your computer's hard disk, but strangers will be allowed to see your Web pages.

For security reasons, Web access is allowed only to the designated Web Folder and folders within it.

## Creating Your Own Web Pages

There are a variety of ways to create your own Web pages to replace the sample pages from Apple. The easiest is to use an HTML editor such as Claris HomePage.



---

FIGURE 8-54: Making a Web page with Claris HomePage.

When you have created a new home page, use the **Select** button to publish it on the Web.

## Using Directory Listing

If someone uses only the hostname or IP address of your computer to access it from a Web browser, they will be presented with your home page. But if they use a folder name in addition to the hostname or IP address, Web Sharing will generate a HyperText directory listing. This makes sharing files with people on the Internet as easy as sharing files over the office network.

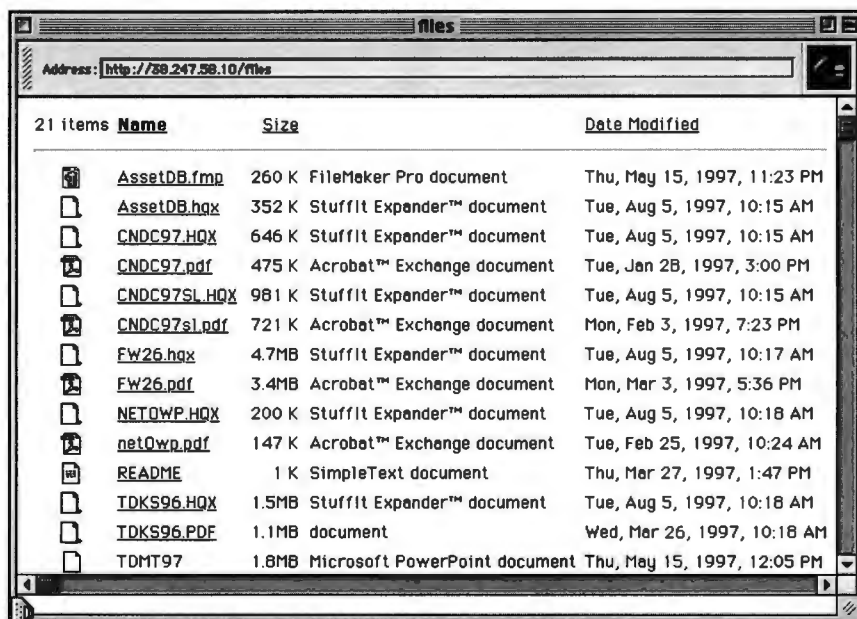
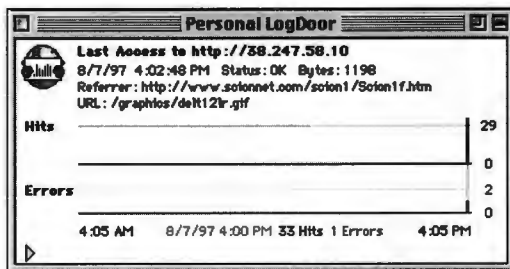


FIGURE 8-55: Personal Web Sharing's directory listing feature (Microsoft Internet Explorer).

## Using Personal LogDoor

Personal Web Sharing does not provide an Activity window like that of Personal File Sharing. However, you can use an inexpensive application from Open Door Networks, Inc. to see how many “hits” your personal Web site is getting. This application is called Personal LogDoor.



---

FIGURE 8-56: Using Personal LogDoor to monitor activity.

Visit the Open Door Web site at <http://www.opendoor.com> for more information.

## USING APPLESHARE IP EMAIL

The majority of Internet email is handled by mail hosts using Simple Mail Transfer Protocol (SMTP), the standard supported by AppleShare IP. Many software companies make Post Office Protocol (POP) clients that can connect to SMTP servers via TCP/IP. Examples include Claris Em@iler, Microsoft's Internet Explorer, Netscape's Navigator and Communicator, and Qualcomm's Eudora.

Claris Em@iler (version 2) can also log on to the AppleShare IP server over AppleTalk.



## Connecting over TCP/IP

If AppleShare IP email is available on your network and your account has been enabled to use it, you will need to ask the following questions to set up your email client software for use over TCP/IP:

- What is my Internet alias?
- What is my email address?
- What is the hostname of my server?
- Should I enable Authenticated Post Office Protocol (APOP)?

Many applications can be used to receive Internet email, including many Web browsers. Contact your administrator to determine which one you should use.

## Internet Config

Many Internet applications, and even Mac OS 8 itself, install the Internet Configuration System or “Internet Config.” This is a freeware application designed to make the lives of Mac OS users easier by reducing the number of times they need to enter preferences into various Internet programs. This is the best place to configure your email account information, because the information then becomes available to all “Internet Config-aware” utilities that you might use (e.g., email application, Web browser, etc.).

Locate your copy of Internet Config. If you do not have one, it can be found on numerous Internet software archives. If your computer uses Mac OS 8, it can be found in the “Internet Utilities” folder within the “Internet” folder.

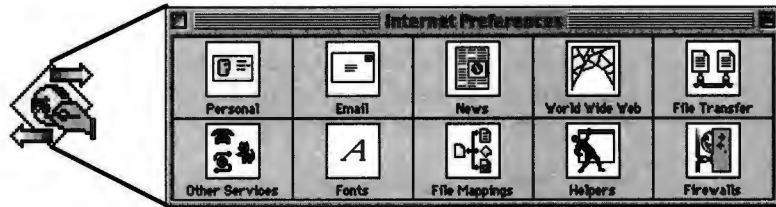


FIGURE 8-57: Using Internet Config.

Press the **Email** button to open a preferences configuration window.

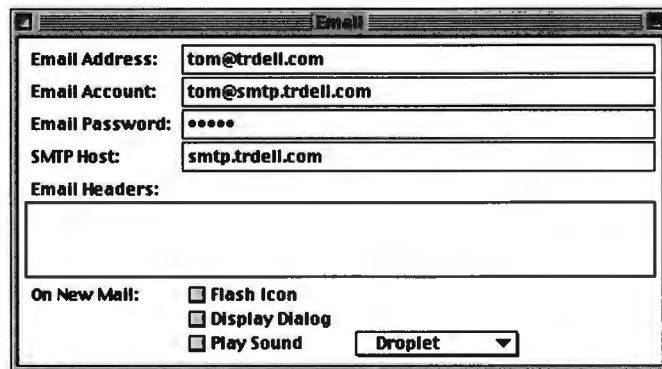


FIGURE 8-58: Configuring Email preferences.

Here, enter your email address in the **Email Address** field. This is the address you give out to other people. It includes your Internet alias, as supplied by your administrator, and your organization's domain name (e.g., "me@mysite.com"). In most cases, you will type the same thing into the **Email Account** field, but your administrator may give you a longer name to type here (e.g., "me@pop.mysite.com," "me@smtp.mysite.com," etc.). Enter your AppleShare IP password in the **Email Password** field (or leave it blank for greater security). Finally, enter the hostname of your AppleShare IP Mail Server in the **SMTP Host** field (e.g., "smtp.mysite.com").

These preferences will now be available to other Internet applications. Some applications will look for Internet Config automatically. Others, such as Claris Em@iler Lite, which ships with Mac OS 8, will require that you enable a preference. If your email application is not Internet Config-aware, you can enter this information directly into the appropriate fields.

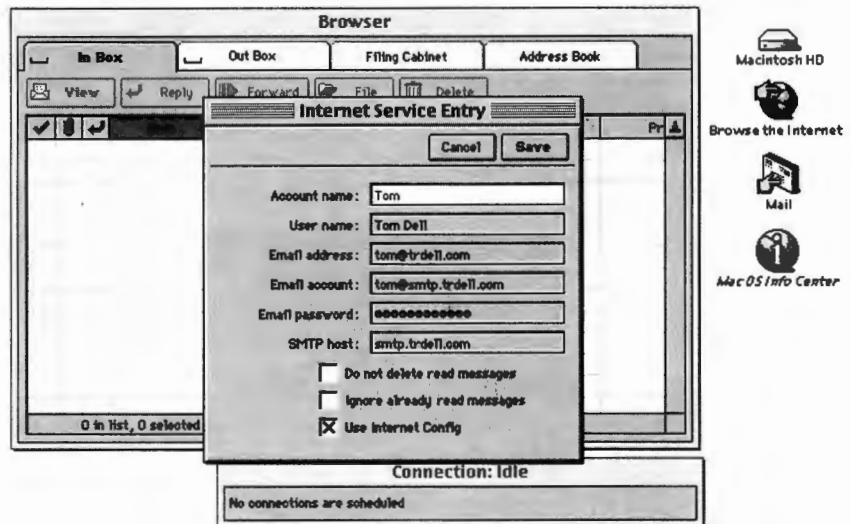


FIGURE 8-59: Enabling an Internet Config preference in Claris Em@iler Lite.

## Using APOP

Some applications permit the use of Authenticated Post Office Protocol (APOP), a more secure way of downloading email from the server to your client application. If your administrator has enabled this on your server, you must also enable it on the email client so that you can connect.

## Connecting over AppleTalk

If AppleShare IP email is available on your network and your account has been enabled to use it, you must ask the following questions to set up your email client software for use over AppleTalk:

- What is my Internet alias?
- What is my email address?
- What is the AppleTalk name of my server?
- What zone is my server in?

AppleTalk-based email can be retrieved using Claris Em@iler version 2. This application was designed to exchange email with the Claris OfficeMail server, but it can also be used with AppleShare IP.

To enable AppleTalk email access, you will need to configure an “Office-Mail” account in Claris Em@iler.

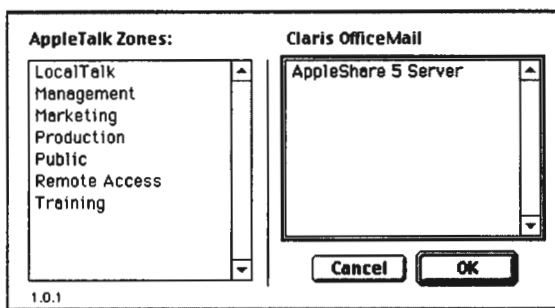
The screenshot shows a window titled "Claris OfficeMail Account Entry". It has three tabs: "Account Info", "Options", and "Notifier". The "Account Info" tab is active. Inside this tab, there are several labeled text input fields: "Account name:" with the text "Tom Dell", "Full name:" with "Tom Dell", "Email name:" with "Tom", and "Password:" with a masked password "\*\*\*\*\*". Below these is a "Server name:" label followed by a "Choose Server..." button. At the bottom of the window are three buttons: "Change Password...", "Cancel", and "Save".

---

FIGURE 8–60: Configuring a Claris Em@iler 2 account.

In the **Account Name** field, enter your AppleShare IP user name. Enter your full name as you would like others to see it in the **Full name** field. Enter your Internet alias in the **Email name** field. Enter your AppleShare IP password in the **Password** field (or leave it blank for greater security).

Next, press the **Choose Server** button. In the window that appears, select the zone and the server name as specified by your administrator.



---

FIGURE 8-61: Choosing the server.

## Email Conventions

Email was designed to handle relatively small text messages. However, it has evolved as a means of exchanging larger documents through the use of *enclosures* or *attachments*. For the best possible performance and reliability, make sure that any email enclosure you send is as small as possible, and in a format that the recipient can use most easily.

## Compression

One way to reduce the time it takes to move an enclosure file through an email system is to compress it. This can be done easily using the StuffIt series of utilities from Aladdin Systems. The DropStuff application will compress files. Simply drag a file onto its icon to create a compressed copy that can be enclosed with your email. The StuffIt Expander application can be used to de-compress enclosures when you receive them.



---

FIGURE 8–62: Aladdin System's DropStuff and StuffIt Expander.

If you do not have these utilities, they can be found on numerous Internet software archives and the Aladdin Web site at <http://www.aladdinsys.com>. If your computer uses Mac OS 8, they can be found in the "Internet Utilities" folder within the "Internet" folder.

Some email systems restrict the size of the enclosures they accept. For example, you may wish to send a 1-Mbyte file enclosure to a friend, but his email system restricts incoming enclosures to just 512 Kbytes. With compression, you might be able to reduce the size of the enclosure sufficiently so that it will be accepted.

## Encoding

Since email systems were designed to receive text messages and not binary data such as software applications, many systems cannot accept standard file enclosures. To circumvent this limitation, email systems use *encoding*. This involves translating a binary document into text at the sending end and then translating the text back into binary data at the receiving end. For this to work, both the sender and the receiver must use the same encoding method.

In general, your encoding choices are:

- **BinHex.** Use this method when sending files to Mac OS users.
- **Base64.** Use this method when sending files to Windows users.
- **UUencode.** Use this method when sending files to UNIX users.

Many email client applications will permit you to make these choices on a message-by-message basis.

## USING NETWORK PRINTING

There are three ways to print from your Mac OS computer: to a printer that is attached to your computer directly, such as a StyleWriter or Personal LaserWriter; to a printer connected to your computer indirectly via the network, such as a LaserWriter or LaserJet; or to an AppleShare print spooler, which will in turn print to the first available network printer.

### Printing to a Network Printer or Print Queue

Communication with any AppleTalk printer requires a *printer driver*. Like the AppleShare client, printer drivers are Chooser extensions that you must click on to browse a list of network printers. You open the Chooser by selecting the **Chooser** item under the **Apple ()** menu bar item.

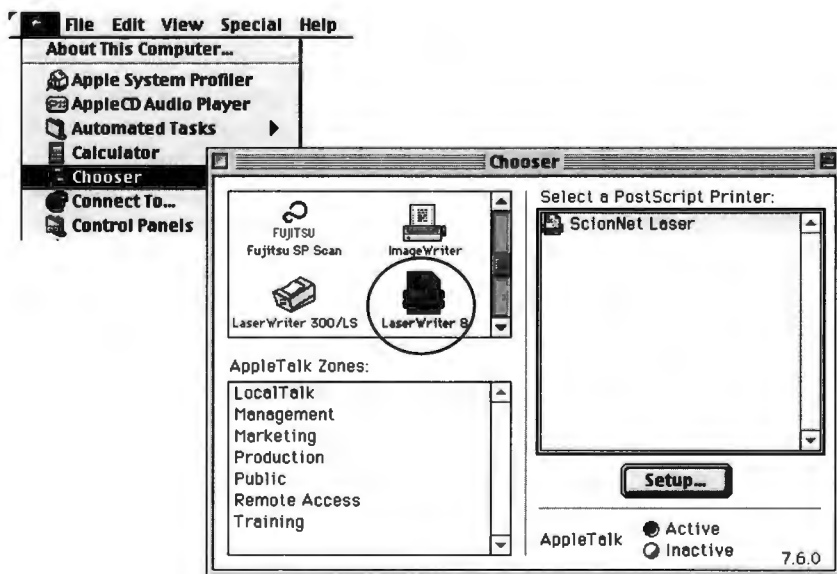


FIGURE 8-63: Opening the Chooser (printer driver selected).

Different types of printers use different printer drivers, most of which are named after the appropriate printer.



---

FIGURE 8–64: Printer drivers for ImageWriter, StyleWriter, Color StyleWriter Pro, Personal LaserWriter, and LaserWriter.

If you do not see a driver for the device you wish to use, contact your administrator. The highest performance is usually achieved using the LaserWriter 8 driver. Its icon looks like this:



---

FIGURE 8–65: High-performance LaserWriter 8 driver.

Once you have connected to a network printer, you will not have to re-connect to it each time you wish to print. Your computer will remember your choice, which becomes your default printer.

In addition to the printer driver, many network printers require the use of a PostScript Printer Description (PPD) file. This tells the printer driver about capabilities unique to the specific printer, such as its memory configuration, resolution, color capabilities, and paper tray handling. PPD files are stored in the “Extensions” folder of the System Folder.

Before you select a default printer, you should ask your administrator:

- Which printer or print queue should I use?
- What zone is it in?
- What PPD should I use?



## Choose Printer

Open the Chooser and select the appropriate icon in the upper left of the window.

If your network is divided into zones, these will be listed in the lower left of the window. (If your network is not divided into zones, there will be no list in the Chooser). Select the zone specified by your AppleShare administrator.

All AppleTalk printers capable of using the selected printer driver in the zone you have chosen will appear in the upper right of the window. Select the name of the printer specified by your administrator here.

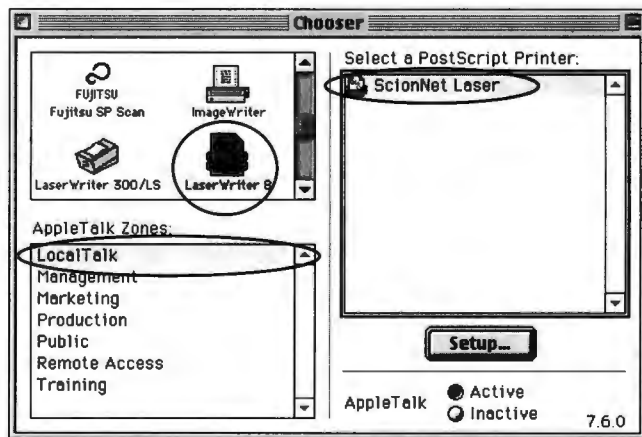


FIGURE 8-66: Locating a printer.

If your administrator has directed you to select a print queue, or print *spooler*, you will see its name accompanied by a “spool” icon.

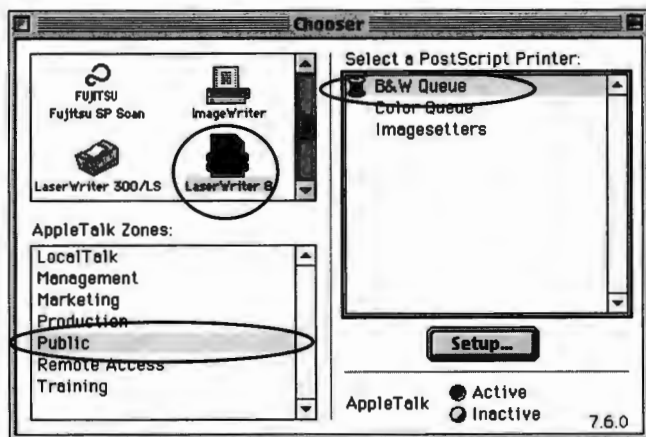


FIGURE 8-67: Locating a print spooler.

## Set up Printer

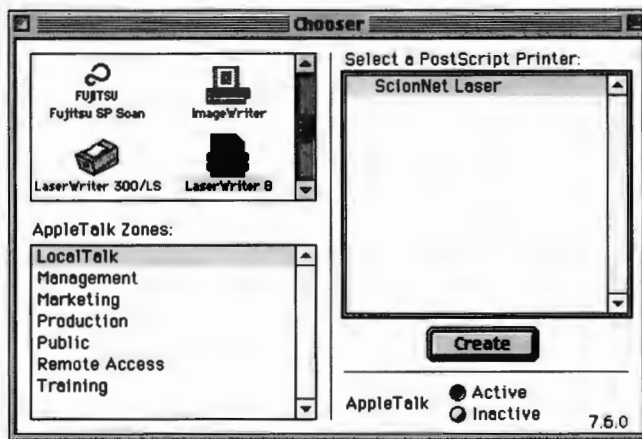
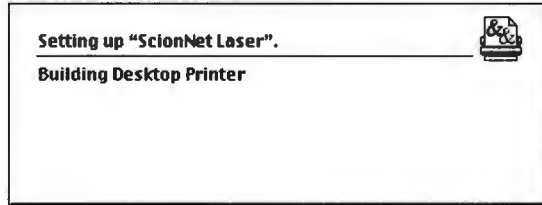


FIGURE 8-68: Creating a desktop printer.

When you have made a selection, the **Create** button will become active. Press this button to configure the printer driver with a PPD and to create your desktop printer icon.



During this process, the printer driver will communicate with the selected printer to determine its type and features, and then configure itself with the most appropriate PPD file.

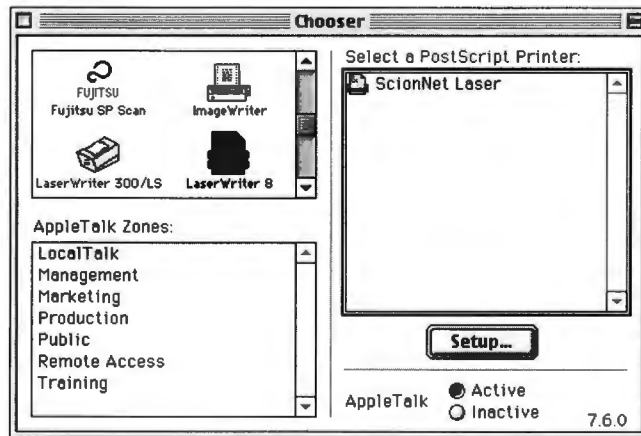
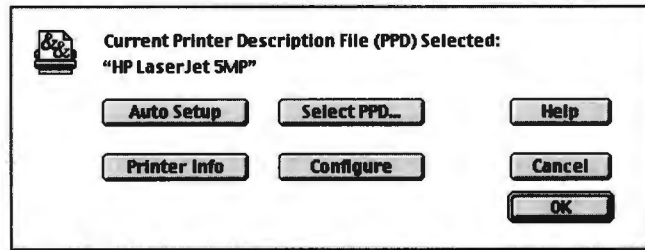


FIGURE 8–69: Configured printer driver and desktop printer.

When the process is complete, an icon will appear next to the printer listing in the Chooser window. If desktop printing is enabled for your computer, an icon will appear on the desktop as well.



To ensure that the printer has been configured with the correct PPD, press the **Setup** button. In the window that appears, make sure that the PPD listed is correct. If not, use the **Select PPD** button to find the right one. Contact your administrator if the correct PPD is not present. You may also use the **Configure** button to make sure the driver knows about all of the printer's options, such as extra memory and paper trays.

You may set up an AppleShare IP print queue in the same manner. Close the Chooser when you have finished.

## Using Desktop Print Monitor

If your computer is enabled with desktop printing, a new desktop printer icon will appear each time you set up a printer in the Chooser. You may then choose between the various desktop printers without having to go to the Chooser again.



The desktop printer with the bold line around it is the default. It will be used for all print jobs unless you choose a different one.

To print to a desktop printer, you may use the traditional **Print** command under an application's **File** menu bar item, or you can drag-and-drop the document you want printed directly onto the icon.

During the printing process, your document is stored in a print queue. This queue can be controlled by double-clicking on the desktop printer icon.

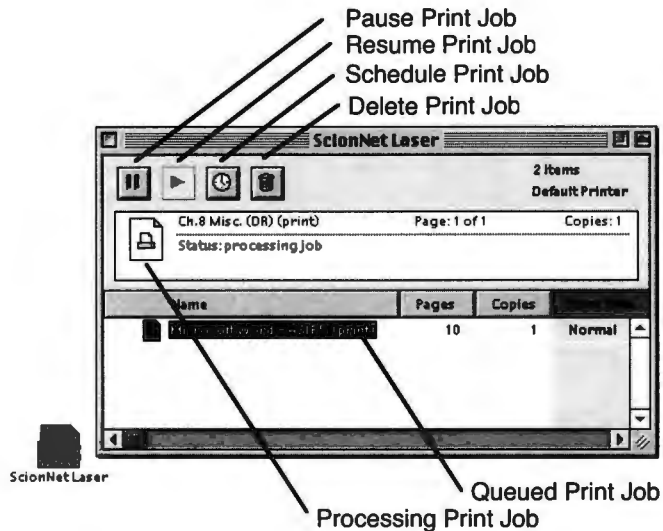


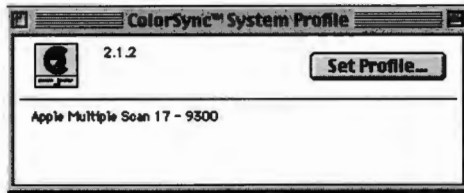
FIGURE 8-70: Working with the Desktop Print Monitor.

When you select a desktop printer, a **Printing** menu item becomes active. Under Mac OS 8, you may also control the printer using contextual menus (clicking on the icon while holding down the **Control** key).

If your computer is not equipped with desktop printing, the traditional Print Monitor will be activated during printing. It provides the same options as does the Desktop Print Monitor, but is accessible only under the Finder and only during printing.

## Using ColorSync

If you are planning to print to a color printer, open the ColorSync control panel by choosing **ColorSync System Profile** in the **Control Panels** folder under the **Apple (🍏)** menu bar item. Here, use the **Set Profile** button to choose the description that most closely matches your computer's monitor.



---

FIGURE 8-71: Setting the ColorSync System profile.

ColorSync makes sure that the color in the document you print is as close as possible to the color you see on the screen.

## BASIC USER SUPPORT

The audience for this section should be the AppleShare administrator. Here I will return to the discussion of AppleShare IP management.

## Managing Share Points

To AppleShare users, the server is visible only as a set of named volumes. Since this is as much of AppleShare as they will ever see, you should set up your server's share points carefully in order to reduce possible confusion.

Some AppleShare administrators share the server's entire hard disk. This provides users with the greatest autonomy, as they are free to create folders wherever they please within the server's file structure and they have only one volume to mount on their desktops. More often, however, administrators will use multiple shared volumes to host different types of data made available to different groups of users. This is generally more convenient for users, as they can navigate a volume of data that is useful to them without first having to locate it among the folders and files belonging to others. It also provides data security. Only those who should be allowed to use a particular volume's data are given access privileges to it.

## Naming Strategies

Plan ahead and deploy shared volumes that will be the most convenient for your users to work with. I have seen many different strategies employed and all are unique to the type of work the organizations perform. Following are a few volume naming strategies that I see repeatedly.

**Network install.** If you do not employ an automated software distribution tool on your network, such as Datawatch's netOctopus or Wave Research's FileWave, the next best thing is a network installation volume. This is a folder on the server that users can look to for the latest versions of applications, updaters, and critical software components.

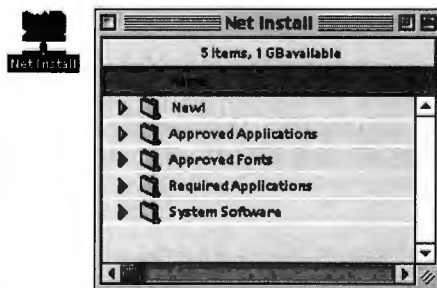
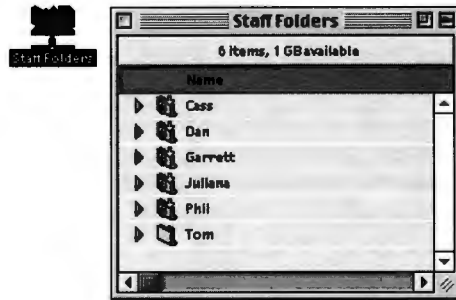


FIGURE 8-72: Creating a network installation share point.

**Staff folders.** People like to have a place of their own on the server, especially if hard disk space is scarce on their workstations. You could create a private share point for each user, but depending on the size of your organization, that might make scrolling through the log-on dialog box an overly lengthy process. Instead, create a share point that contains folders for each user.



---

FIGURE 8-73: Creating a staff folders share point.

To give users peace of mind, you can make them the owners of their folders and give a group of their co-workers write-only access. That way, co-workers can drop files into the folder but cannot see what else is in it.

**Applications.** If you are going to allow users to run some applications from the server, you can create a volume specifically for these programs. The folders within can be listed in alphabetical order ("A-D," "E-H," and so on), or perhaps by application type ("Word Processing," "Desktop Publishing," "CAD," etc.).

**Departmental folders.** If your organization can be described in terms of clearly delineated departments and job functions, you can use these divisions as a share point naming convention. Give each department its own folder; then store the data and applications unique to each department there.

**Project folders.** For some organizations it makes more sense to create share points for each project rather than each department, especially when everyone needs access to the same data.



**Contractor's folders.** Many organizations are reluctant to give temporary employees and subcontractors access to the same data that their regular employees can see. Such organizations restrict temporary workers to a share point of their own.

## Access Strategies

In creating your share points, you will need to assign access privileges to them. By default, the server machine's owner (as entered in the File Sharing or Sharing Setup control panel) owns all folders when the server starts up, and no other access privileges are specified. In my experience, it is best to leave the administrator as owner of most folders. Whoever owns a folder can change its access privileges at any time, and that is a responsibility best left in the administrator's hands.



FIGURE 8-74: Working with access categories.

If there is highly secret data on your server, or if the network is connected to the Internet, the **Everyone** category and the guest user account should be used only with the understanding that they apply to *anyone*. In other words, they provide access privileges to strangers.

If the owner privileges are assigned to the administrator and the **Everyone** category is used only for a few public folders, there is but one category to accommodate all of your network's users and groups. What if you want to assign access privileges to two users or two groups in the same folder?

You will almost never assign just one user to the **User/Group** category. The one time this is useful is when you create a private folder for someone. In most cases, the **User/Group** category will always contain a group.

If your share points are well organized, you can simply create groups for each of them. For example, perhaps you have an "Accounting" share point. Create an "Accounting" group also and add everyone from the accounting department to it. Are there a couple of people from the management who should also be given access? No problem. Add them to the accounting group as well. Users can be members of many different groups.

What if you want everyone in the organization to have access to a given folder, prohibiting access to strangers only? You should not assign privileges to the **Everyone** category if guest access is enabled, but you can create a group that contains all of your users and name it something like "All Users." If you do not enable guest access, you can use the **Everyone** category as it was intended: "everyone who is a registered user" rather than "anyone."

## Working with Share Points

When you have established your server's share points, you will have several special options for managing them.

**Share points within share points.** To create a Share point, select a folder or disk in the Web & File Server Admin's Disks & Share Points window and enable the **Make this a share point and set privileges** checkbox.



FIGURE 8-75: Creating a share point.

You cannot create a share point *within* a share point. All folders contained within the share point are shared, but they do not appear as separate volumes in the AppleShare client log-on dialog box. They adopt the access privileges of the enclosing share point.

In Figure 8-76, I have decided to share the Clip Art folder that resides within the Claris Home Page folder. Although the Applications folder contains this folder, it is not shared and it cannot be shared unless I “unshare” the Clip Art folder. The Super Sampler folder is shared because it is inside the Clip Art share point. It cannot be made a share point on its own unless I unshare the Clip Art folder or remove the Super Sampler folder from it.

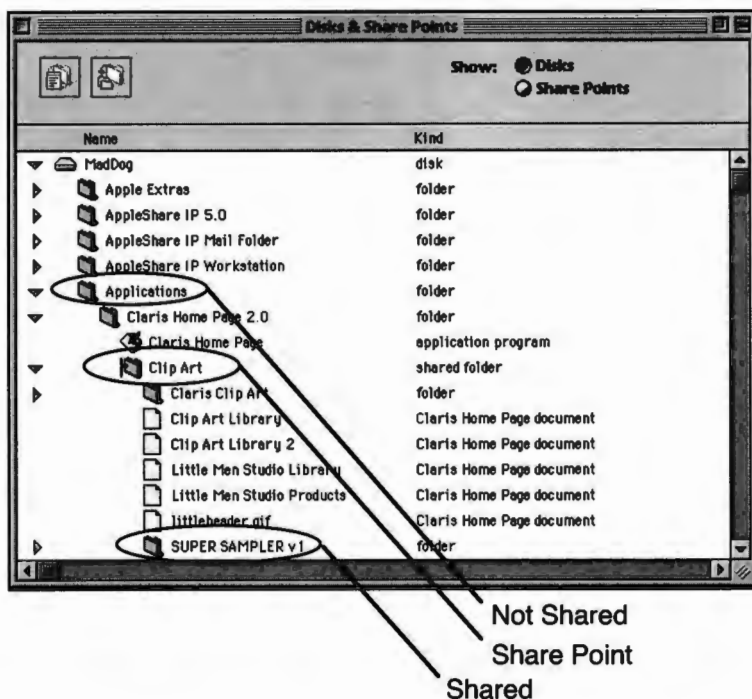
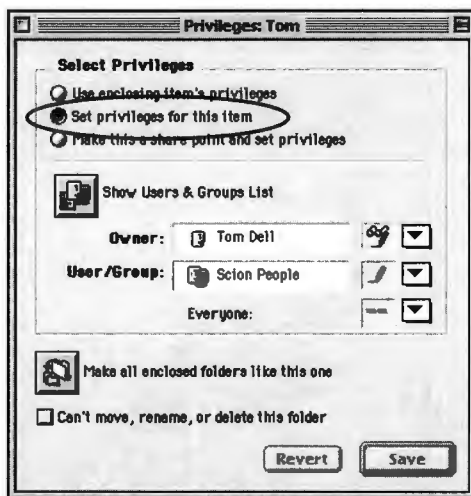


FIGURE 8-76: Shared folder within a share point.

This way, a user will be able to mount the Clip Art folder on the desktop and work with all of its folders. They would neither see nor be able to work with anything else in the enclosing Claris Home Page folder or Applications folder.

**Inherited versus explicit privileges.** When you share a folder, it adopts the access privileges of its enclosing folder by default. These are said to be *inherited* privileges. Whatever values were established in the **Owner** and **User/Group** categories of the share point will be used by the share point's subfolders unless you change them.

When you change the access privileges of a subfolder, you are setting *explicit* privileges. This is done in the subfolder's Privileges dialog box by enabling the **Set privileges for this item** checkbox.



---

FIGURE 8-77: Setting explicit privileges.

When you move a folder that has inherited privileges into another folder, its privileges will change to those of the enclosing folder. When you move a folder that has explicit privileges, those privileges remain constant no matter where it is located.

In Figure 8-78, I have selected two folders. The All Users folder has inherited privileges and so adopts the privileges of the Staff folder's share point. The Tom folder has explicit privileges.

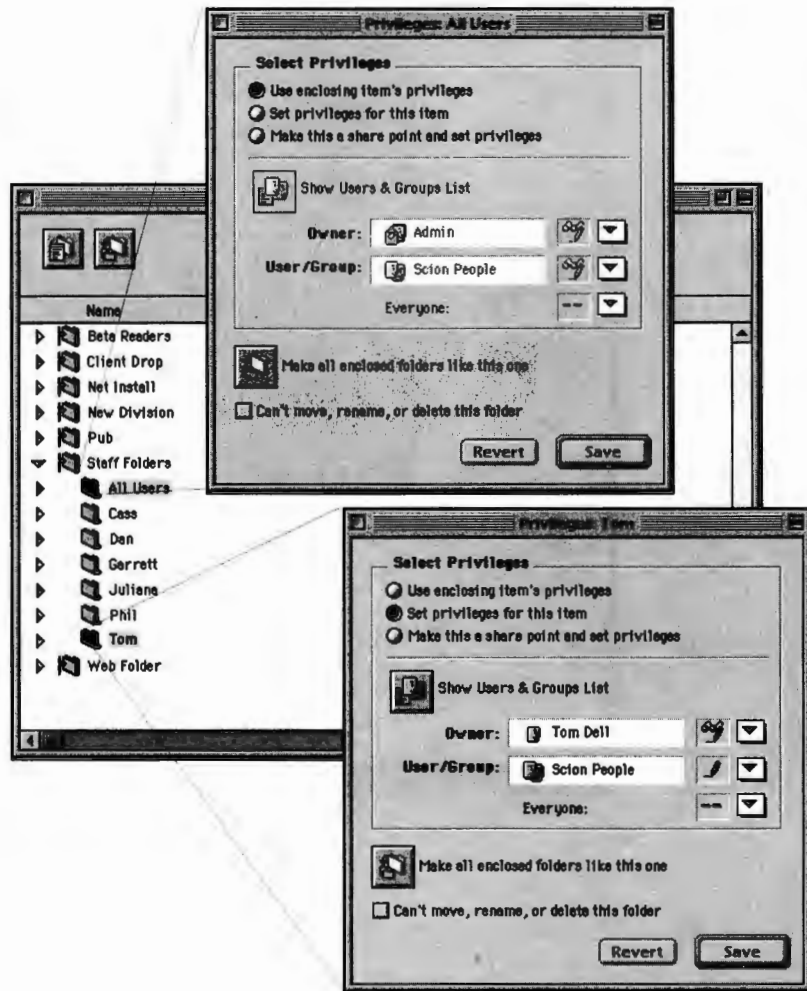


FIGURE 8-78: Inherited and explicit access privileges within the staff folders share point.

Now I move these folders to the New Division folder. The All Users folder changes to adopt the access privileges of its new enclosing folder. The access privileges of the Tom folder, however, remain the same.

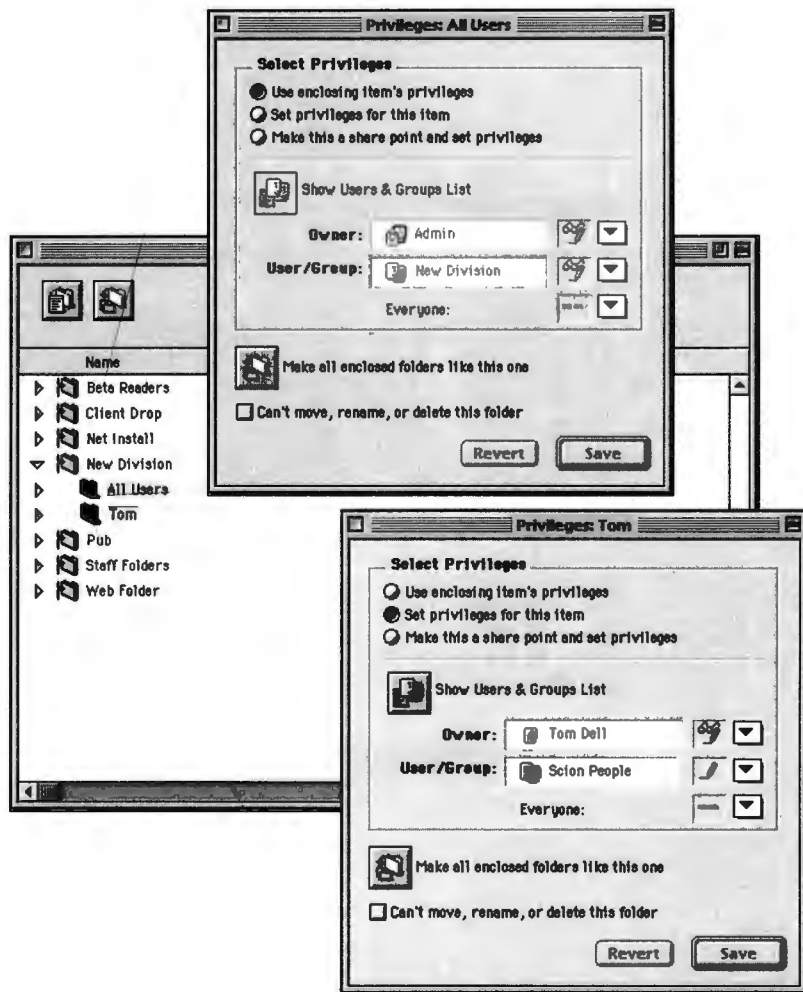
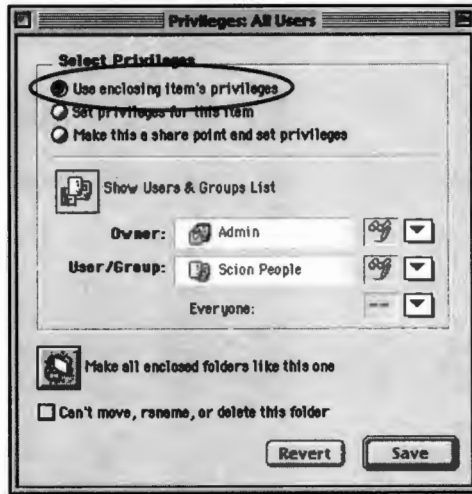


FIGURE 8-79: Inherited and explicit access privileges within the new division share point.

You may change a folder that has explicit privileges to use inherited privileges, which will cause the folder's subfolders to adopt the inherited privileges as well. To do this, enable the **Use enclosing item's privileges** checkbox.



---

FIGURE 8–80: Setting inherited privileges.

**Forcing enclosed privileges.** As you can set either inherited or explicit privileges for a folder, you can force the folders within it to use these same privileges by pressing the **Make enclosed folders like this one** button in the Privileges dialog box. You will be presented with a dialog box in which to verify your intentions.



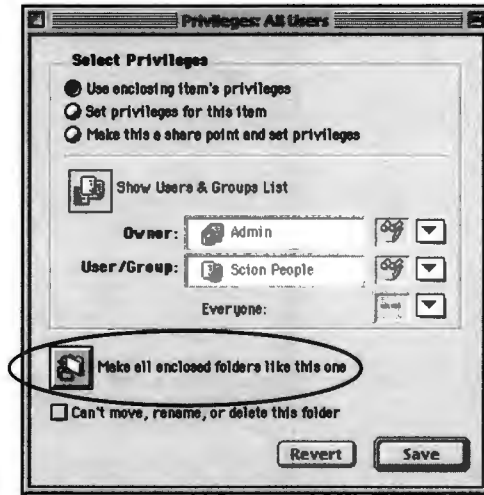
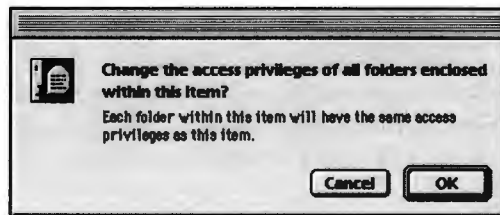
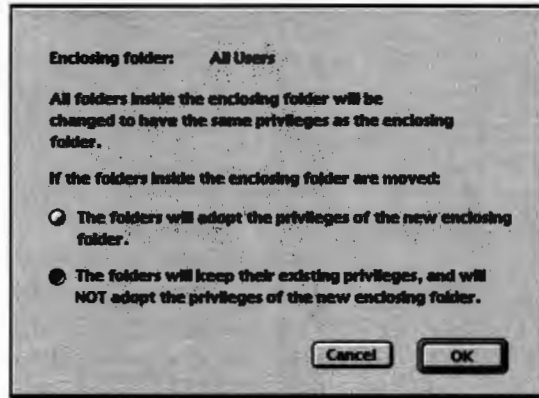


FIGURE 8-81: Setting enclosed privileges.



If you hold down the **Option** key while you press the **Make enclosed folders like this one** button, you will be presented with a different dialog box in which you can change the default behavior of AppleShare when the folder is moved. If you want the folder's subfolders to adopt the same inherited access privileges, enable the top button. If you want the subfolders to maintain explicit privileges, enable the bottom button.



---

FIGURE 8-82: Forcing inherited or explicit privileges on enclosed folders.

**Unsharing a share point.** To make a share point inaccessible to users, simply enable the **Use enclosing item's privileges** checkbox in its Privileges dialog box. Since the share point's enclosing folder or disk is not shared (because you cannot create a share point within a share point), it will adopt the condition of being not shared.

**Locking shared folders.** While AppleShare is running you can lock a server folder so that it cannot be moved, renamed, or deleted by enabling the **Can't move, rename or delete this folder** checkbox in the Privileges dialog box. This restriction will even apply to the folder's owner. The folder can still be copied or opened by anyone with sufficient access privileges.

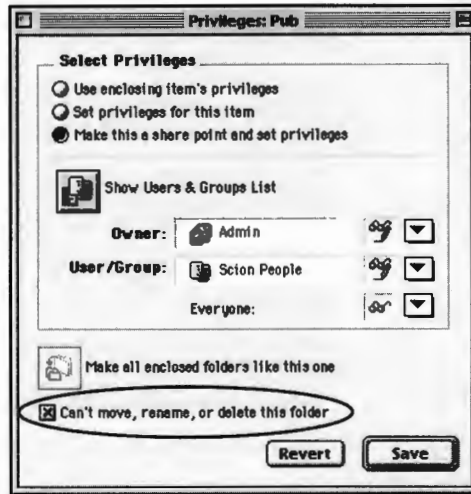


FIGURE 8-83: Locking a shared folder.

**Copy protecting files.** You cannot restrict users from copying folders, but you can copy protect files. To do this, double-click on a file you wish to copy protect in the Disks & Share Points window. In the dialog box that appears, select the **Copy Protect** checkbox.

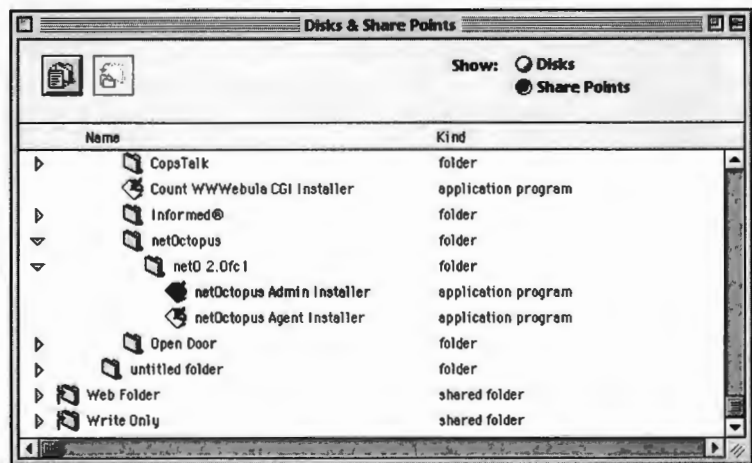
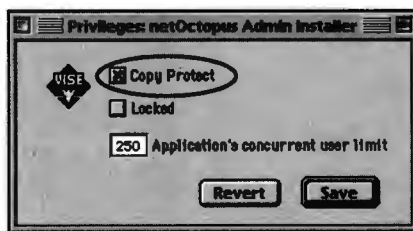


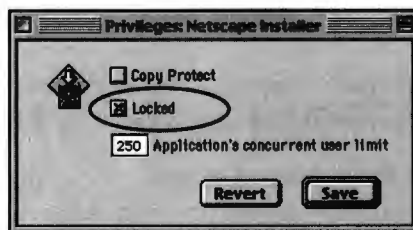
FIGURE 8-84: Selecting a file for copy protection.



---

FIGURE 8-85: Enabling copy protection.

**Locking files.** You can lock a file so that it cannot be moved, renamed, or deleted while AppleShare is running. To do this, double-click on a file you wish to lock in the Disks & Share Points window. In the dialog box that appears, select the **Locked** checkbox.

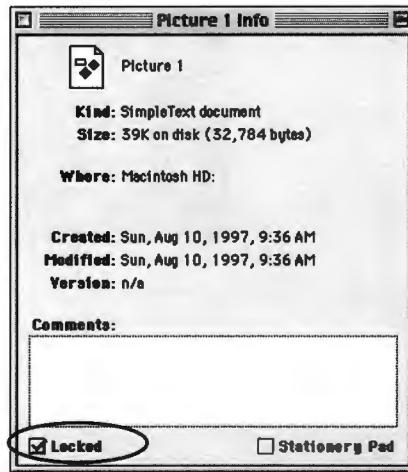


---

FIGURE 8-86: Locking a file.

This restriction also applies to the file's owner. However, the file can still be copied and opened by anyone with sufficient access privileges unless the **Copy Protect** checkbox is also selected.

Users can also lock their own files in the Finder. This is done by selecting a file, choosing the **Get Info** command under the **File** menu bar item, and then enabling the **Locked** checkbox.



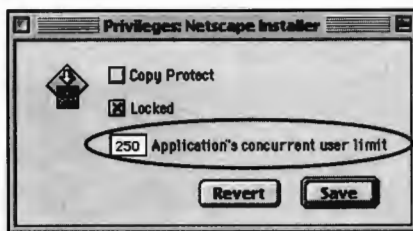
---

FIGURE 8–87: Locking a file through the Finder.

To delete a locked file from the server volume, either unlock it or hold down the **Option** key as you empty the Trash.

**Limiting program use.** You may limit the number of people who can run an application simultaneously in order to ensure compliance with a concurrent user or “site” license. To do this, double-click on an application file that you wish to restrict in the Disks & Share Points window.

In the dialog box that appears, enter the number permitted by the application’s licensing agreement in the **Application’s concurrent user limit** field. Once the limit is reached, the next user who attempts to launch the application will be told to try again later.

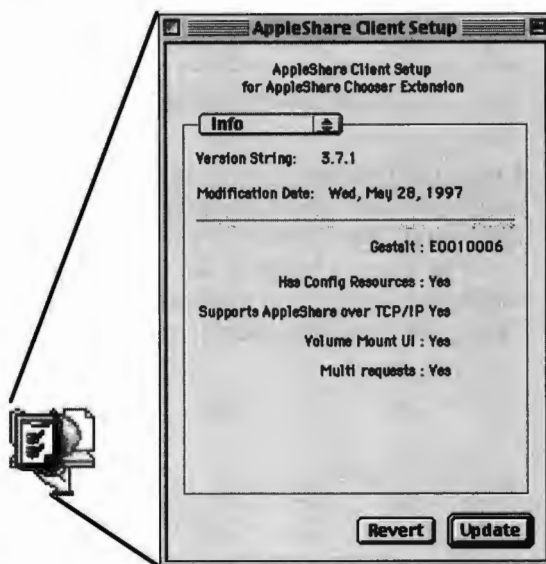


---

FIGURE 8-88: Limiting file use.

## Using AppleShare Client Setup

AppleShare Client Setup is a special utility that can be used by an administrator to modify the behavior of AppleShare clients.



---

FIGURE 8-89: Settings under the Info pop-up menu.

Under the **Info** pop-up menu you can obtain information about the version of the AppleShare IP client that is running on a given machine.

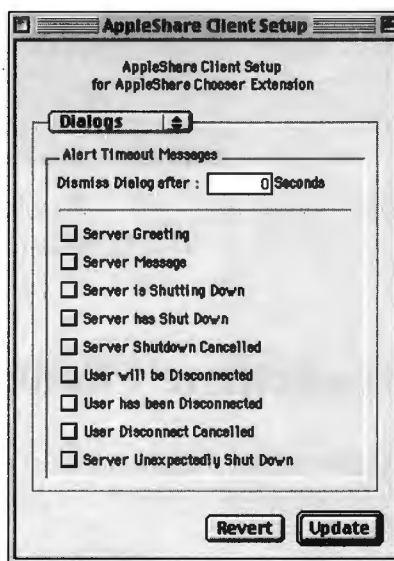
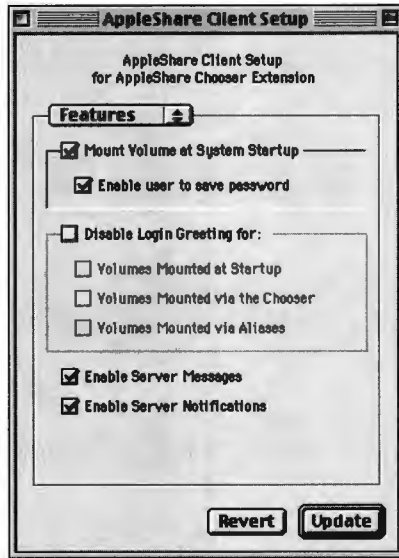


FIGURE 8-90: Settings under the Dialogs pop-up menu.

Under the **Dialogs** pop-up menu you can specify the maximum time that will be allowed to elapse before the server status dialog box is dismissed. By default, these dialog boxes are dismissed manually. By using this feature you can ensure that the machines you rarely interact with, such as dedicated servers, are not held up waiting for someone to press the **OK** button every time the server generates a dialog box.

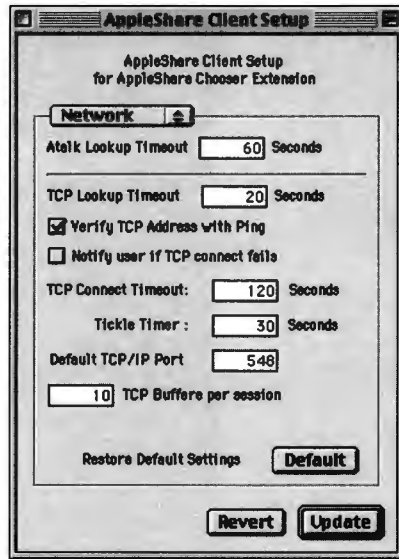


---

FIGURE 8-91: Settings under the Features pop-up menu.

Under the **Features** pop-up menu, you can restrict the client's ability to receive server status dialog boxes. You can also remove the client's ability to save user passwords and to mount volumes automatically at startup.

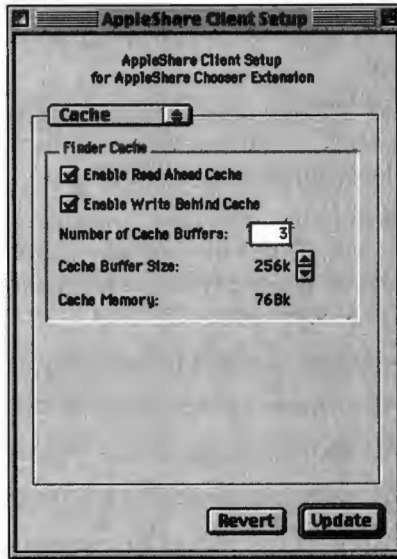




---

FIGURE 8-92: Settings under the Network pop-up menu.

Under the **Network** pop-up menu, you can adjust the amount of time the AppleShare client will wait for a response from a server before giving up on the connection. This can be particularly useful when applied to certain problematic computers that may be attached to the far reaches of the network, or that reside on a network composed of poor-quality cabling.



---

FIGURE 8-93: Settings under the Cache pop-up menu.

Under the **Cache** pop-up menu, you can experiment with the AppleShare client's memory cache in order to improve the speed of file transfers.

## ADVANCED USER SUPPORT

If you read through the first section of this chapter, the thought might have crossed your mind that deploying AppleShare IP takes a lot of work at the client end. To properly deploy AppleShare IP, you should make sure that:

- All client computers have System 7.5.3 or newer installed. This is required for the AppleShare IP client.

- All client computers have Open Transport 1.1.2 or newer installed. This improves performance and is required for the AppleShare IP client.
- All clients have the AppleShare IP client version 3.7 or newer installed. Older versions of the AppleShare client are supported, but they cannot use AFP/TCP.
- If possible, all client computers will be upgraded to Mac OS 8 or newer. This will eliminate confusion that may be caused by the differing access privileges used under System 7/AppleShare and Mac OS 8/AppleShare IP.
- All client computers have AppleTalk configured properly.
- All client computers have TCP/IP configured properly.
- All client computers have Internet Config installed and configured.
- All client computers have a properly configured Web browser.
- All client computers have a properly configured email client.
- All client computers have certain Internet helper utilities, such as Aladdin's StuffIt Expander and DropStuff.
- All client computers have the same versions of commonly used fonts.
- All client workstations use the same printer drivers.
- All client workstations use the correct PPDs.

Daunted? You should be. Migrating to any new networked system can be a monumental task. If you leave users to sort out their own needs, you will make your life more difficult in the long term as they experience problem after frustrating problem. It takes a well-organized effort to bring networked computers up to a uniform level of reliable performance.

Fortunately, there are network management tools that can reduce a migration that could take days to one that requires just minutes. The best of these tools are Dantz' Retrospect, Datawatch's netOctopus, Neon Software's LANsurveyor, and Wave Research's FileWave. Each works somewhat differently and can be applied to different tasks, but any one of them will greatly ease your user support burden. I use them all regularly.

## Scanning Workstations with LANsurveyor

As I have shown you earlier in this book, LANsurveyor is a network mapping tool that presents the devices on your network as graphical objects attached to network segments. It is the best tool I have found for providing a holistic view of your network.

LANsurveyor is not limited to a role of oversight, however. It can also be used to gather specific information about these network objects. For example, imagine that you want to know whether a given workstation has the AppleShare IP client installed. To begin, use LANsurveyor to generate a map of your network; then double-click on the target workstation's icon.

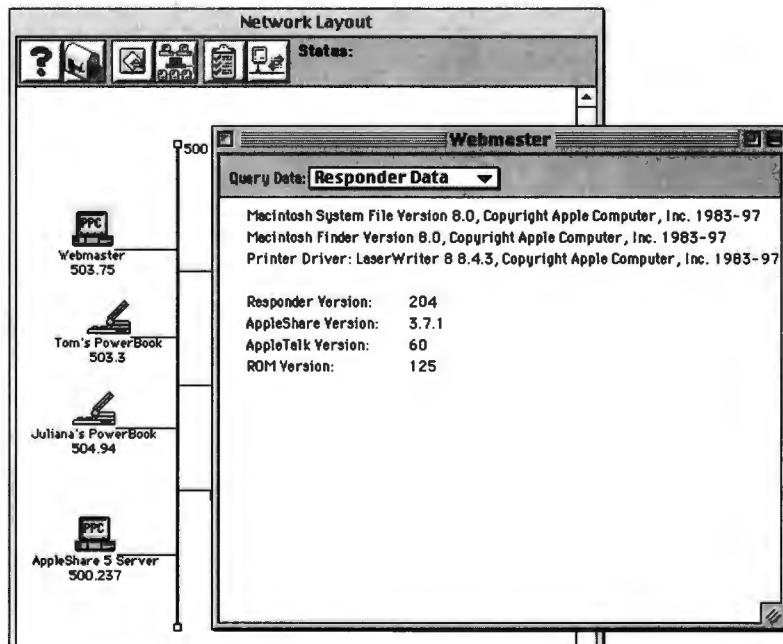


FIGURE 8-94: Getting information for a mapped object.

LANsurveyor presents a window in which detailed information relating to the selected computer is shown, not the least of which is the AppleShare version.

If you have many computers to scan, it might be easier to generate a report of all workstation configurations on the network. Choose the **Select End Nodes** command from the **Navigate** menu bar item to highlight the computers.

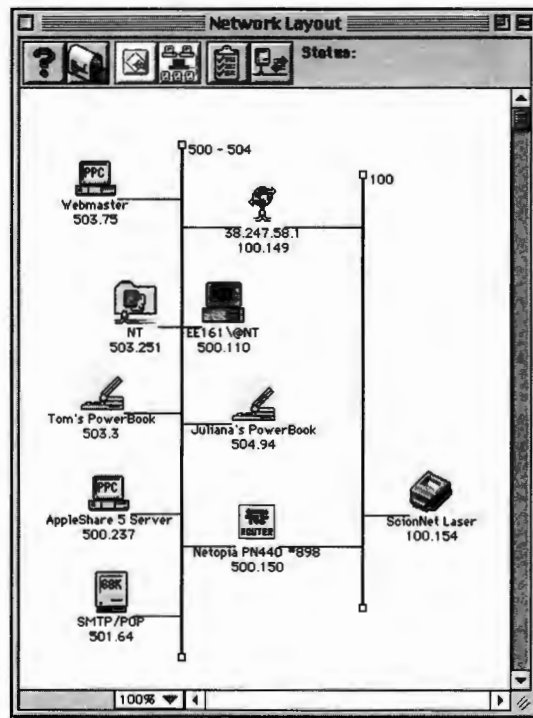


FIGURE 8-95: Selecting end nodes for inclusion in a report.

Next, select the **New template** command from the **Reports** menu bar item to create a new report. You may choose the criteria you wish to scan for by using the **Add Fields** button.

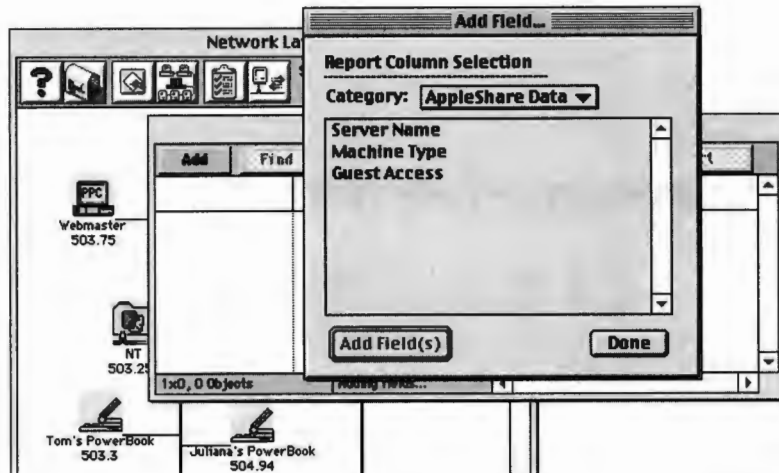


FIGURE 8-96: Establishing scanning criteria.

When you have chosen the combination of configuration data that you wish to view and have arranged it in columns, press the **Run Report** button to complete the report.

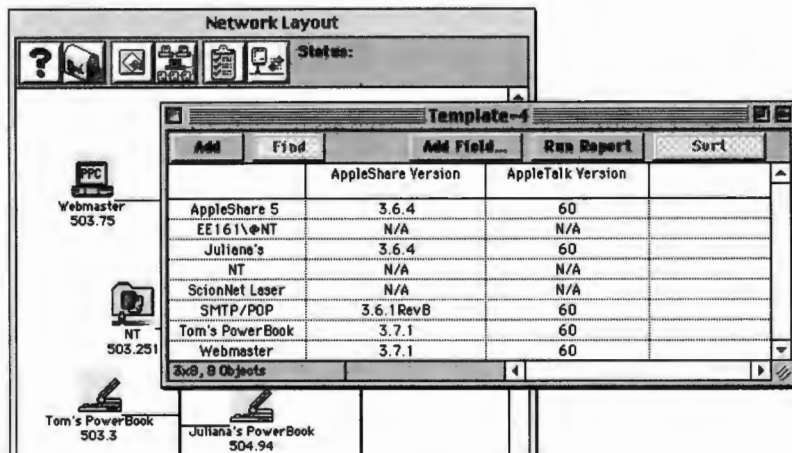


FIGURE 8-97: Generating a report.

Imagine how long it would take you to find this information if you were required to visit each computer personally. With LANsurveyor, you get complete and accurate information in seconds.

## Managing Workstations with netOctopus

Datawatch Corp.'s netOctopus is an impressive workstation management utility. Its system uses a small agent application that is installed on user workstations and a console that is installed on the administrator's workstation.



---

FIGURE 8-98: Viewing the netOctopus agent on a workstation.

With netOctopus, you can query a workstation for just about any information. Hardware, software, configurations—it's all there.

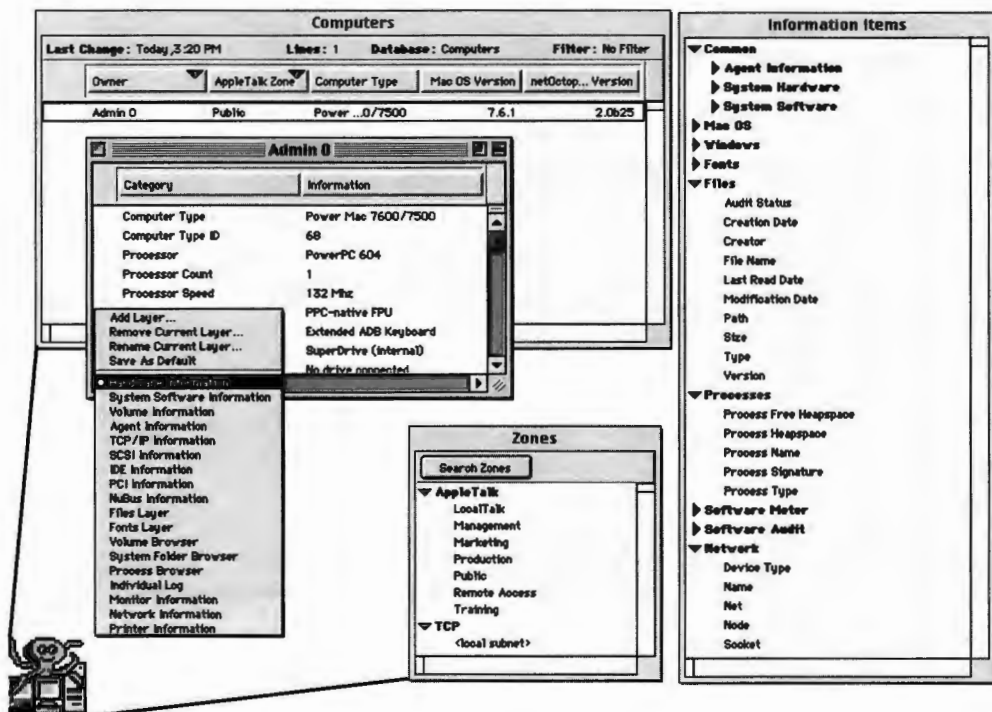


FIGURE 8-99: Querying workstation data with netOctopus.

More impressive still, you can *change* it. For example, imagine that you know there are numerous computers on the network that have not been configured to use TCP/IP. Rather than taking the time to go to each workstation, you can do it remotely with netOctopus. Choose a workstation in the Computers window, then select the **Change TCP Information** command from the **Commands** menu bar item.



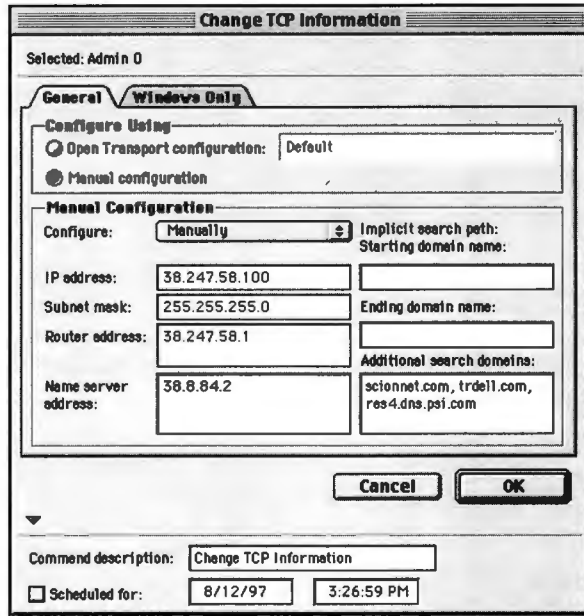


FIGURE 8-100: Configuring a workstation's TCP/IP settings remotely.

netOctopus lets you do almost anything remotely, from your own desk, that can be done while sitting in front of a user's workstation. Projects that used to require weeks and extra personnel can be reduced to brief tasks.

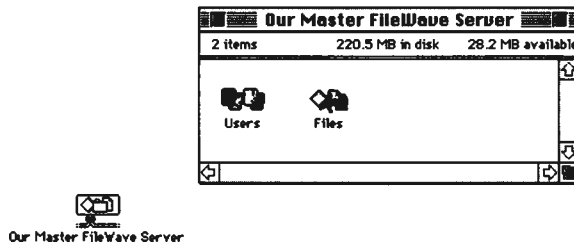
## Managing Workstations with FileWave

Wave Research's FileWave and its companion program Asset Trustee have many of the same capabilities of netOctopus, but they use a different paradigm. netOctopus is primarily an active management tool. Administrators use it when they wish to install a specific piece of software, perform a specific function, or obtain a specific kind of data. Wave Research's products have been created for administrators who wish to take a more automated approach to network configuration. Administra-

tors set up FileWave once to reflect what they want installed on networked workstations, and the system performs the task—however lengthy—from that point on. Asset Trustee gathers workstation information automatically and stores it in a database that can be queried via a built-in Web server.

By way of example, imagine that you wish to install an email client on all of your workstations. First you use the FileWave Administrator application to log in to a FileWave Repository Server via the Chooser and mount its server volume. This might sound like AppleShare, but the resemblance is superficial. FileWave actually uses the Finder in very different ways.

Double-click on the Repository Server volume to open it and you will find that it contains icons for users and files. These two icons contain the *user models* and the *file models* that you create and manage and that determine what FileWave will distribute and to whom.



---

FIGURE 8-101: Opening the mounted Repository Server volume.

Wave Research includes a demonstration model for distributing an application called *MenuMail*. You can see this by double-clicking on the Files icon in the Repository volume window.

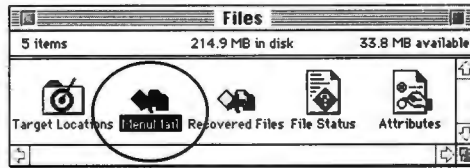


FIGURE 8-102: Locating MenuMail inside the Files icon.

Double-click on the MenuMail icon to see the set of files that are to be distributed. This is called a *FileSet*.

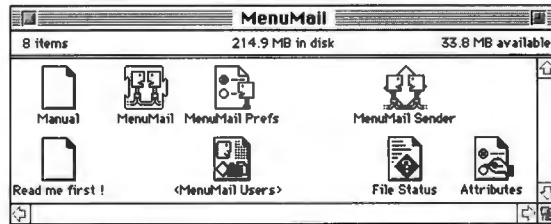


FIGURE 8-103: Viewing files in the MenuMail FileSet.

Before this FileSet can be distributed, FileWave must know to whom it will go. Destinations are established in *user groups*. Double-click on the Users icon in the Repository volume window. In the Users window you will see several user groups, including one that Wave Research created for *MenuMail Users*. The primary user group is “All Users.”

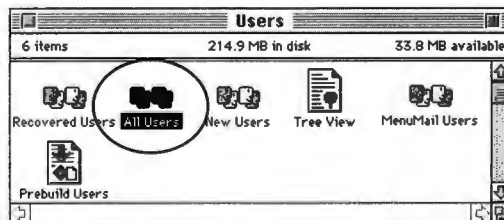


FIGURE 8-104: Working with user groups.

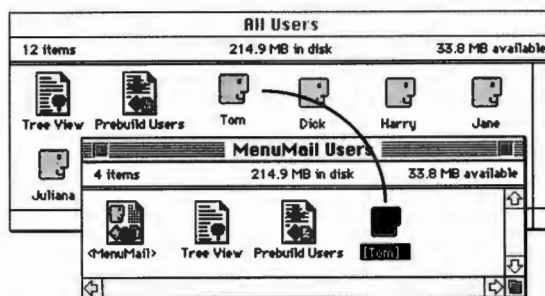


FIGURE 8-105: Dragging “Tom” into the MenuMail User Group window.

Drag the icons of those users on whose workstations you want the email client installed from the All Users window into the MenuMail Users window while simultaneously holding down the **Command (⌘)** key. Then close all open windows and select the **FW** menu bar item that appears on the administrator’s computer. Here choose the **Update Server Model** command. That is *it* as far as you are concerned!

At the users’ end, a FileWave user application is installed on their workstations. It is in constant communication with the Repository Server so that when a new installation becomes available, it is completed in the background (although users can monitor the process in the FileWave application).

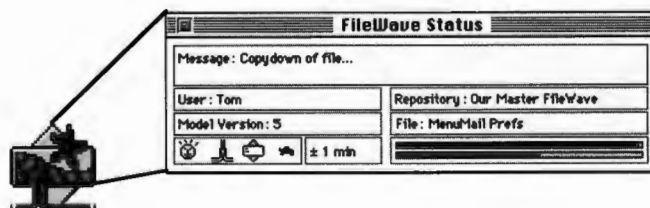
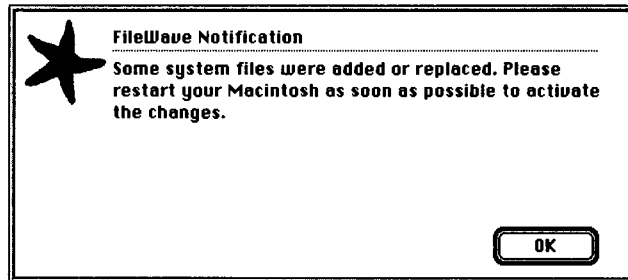


FIGURE 8-106: File installation can be viewed using the FileWave user application.

When completed, FileWave will notify the user if the Macintosh must be restarted for parts of the application to be loaded.



---

FIGURE 8-107: FileWave notifies a user when a restart is required.

One of my favorite features of FileWave is its ability to perform seemingly simultaneous upgrades. Imagine that you do not want users to use the email client until after a training session. You can direct FileWave to distribute the application but to make it invisible until the training session is complete. When users return to their desks, they find that the new software that they just learned all about has magically appeared on their hard drives!

Before you distribute software, you will usually need to examine your network's workstations to make sure they meet the minimum system requirements and to determine how many licenses you should buy. This is where the Asset Trustee component comes in handy. It is a comprehensive database that is constantly updated by the FileWave user software to record workstation configurations.



FIGURE 8-108: Opening Asset Trustee's Dashboard.

The various computer systems in the data file can be viewed as a list.

Systems: 18 of 18				
SYSTEM ID	DESCRIPTION	USER NAME	DEPT	PLAT
480001	Mac SE, 1/80, ImageWriter II	JORDAN, Michael	MIS	Mac
480002	Mac II, 4/40, ImageWriter	EISENBERG, Naomi	MIS	Mac
480003	Mac II, 4/40, ImageWriter LQ	CLEMENTE, Roberto	ENGR	Mac
480004	Mac SE, 2/40, LaserWriter INT	PRICE, Marianne	ACCT	Mac
480005	Mac IIfx, 8/80, LaserWriter IISC	YOUNG, Neil	GRAPH	Mac
480006	Mac SE, 2/20, ImageWriter II	PREFONTAINE, Steve	FIN	Mac
480007	Mac SE, 2/40, ImageWriter LQ	KINGDOM, Roger	GRAPH	Mac
480008	Mac SE/30, 4/80	KRISTIANSEN, Ingrid	PROG	Mac
480009	Spares system for unused items	JORDAN, Michael	MIS	Mac
480010	Broken or discarded items	JORDAN, Michael	MIS	Mac
480011	Mac IIfx 4/80	SCHWARZENEGGER, Art	PR	Mac
480012	Mac IIfx, 4/80, 2-Page Display	GRIFFITH, Florence	MKTG	Mac
480013	Mac IIfx, 2/40	MCDOWELL, Malcolm	MIS	Mac
480014	Mac SE, 2.5/20	BAUM, L. Frank	MIS	Mac
480015	Mac SE/30 2/40	WILLIAMS, Vanessa	PROG	Mac
480016	Mac IIfx, 4/80	JOYNER, Jackie	LAB	Mac
480017	Mac SE/30, 4/80	VONNEGUT, Kurt	MIS	Mac
480018	Everex 486/30, NEC 14" Monitor	BILKO, Earnest J.	MIS	PC

FIGURE 8-109: Generating a systems list view.

Each computer in the list can be queried further for greater detail.

**Entry for Systems**

System ID: 4E000005 Desc: Mac IIci, 8/80, LaserWriter IISC

Location: Boston Annex User: YOUNG, Neil

Dept: GRAPH Platform: Mac

Undefined1: Undefined2: Undefined3:

**SYSTEM HISTORY: 2**

DATE	NOTE SUMMARY	WRITER
12/15/90	Moved from Building 178, Rm 1A today	Manager
06/26/90	Replaced ImageWriter with LaserWriter IISC	Manager

**SCANNED NUBUS CARDS: 2**

CARD NAME	MANUFACTURER	VERSION
Mac II High-Resolution Video Card	Apple Computer	HRVC 1.0
Tri-Data Systems Mac II Ethernet Adapter	Tri-Data Systems	1.5

FIGURE 8-110: Viewing data for the System in detail view.

This data can be sorted and viewed in a number of report formats. For example, how about a pie chart showing the total hardware expenditures in Apple products for each department?

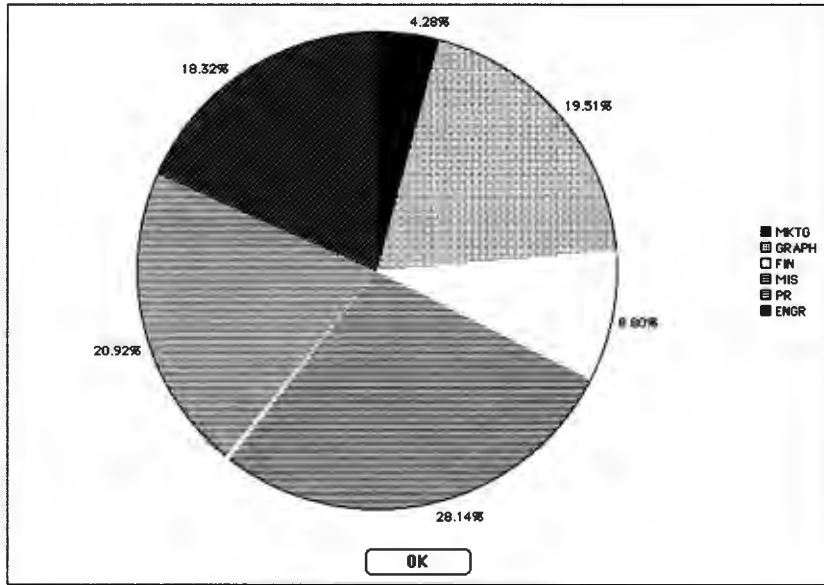


FIGURE 8-111: Generating a pie chart of hardware expenditures for each department.

Finally, all of this data can be made available to selected users over the Web or your Intranet using Asset Trustee's built-in Web server.



FIGURE 8-112: Accessing the Asset Trustee database with a Web browser.



Once you have FileWave and Asset Trustee configured and running, you can rest assured that your users will be well cared for. Even if they delete applications or files accidentally, they are protected. FileWave will automatically re-install them.

## Protecting Workstations with Retrospect Client

I find that most administrators are wise enough to back up their AppleShare servers using Dantz' Retrospect. I am often surprised, however, at how many fail to extend this service to the desktops of their users. Using the Retrospect client, you can back up all the data on your network whether or not it has been copied to the file server.

Consider the rotational backup script I described in Chapter 4. To add your users' hard disks to the backup, you must first install the Retrospect client on each computer.

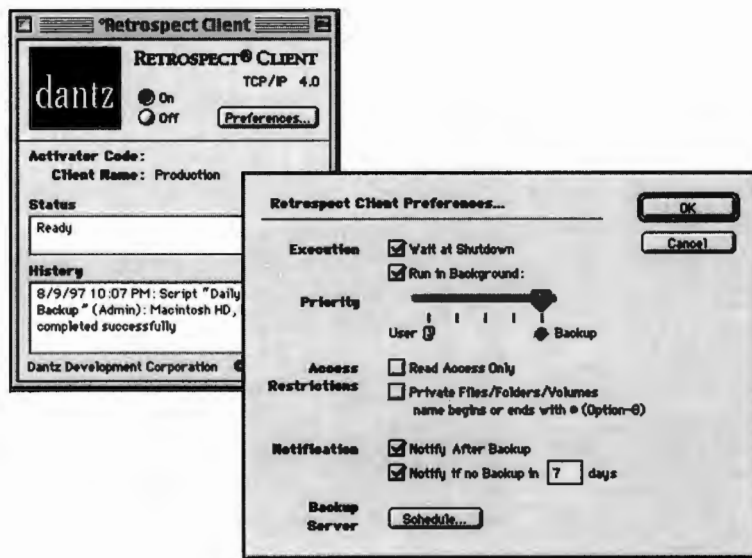
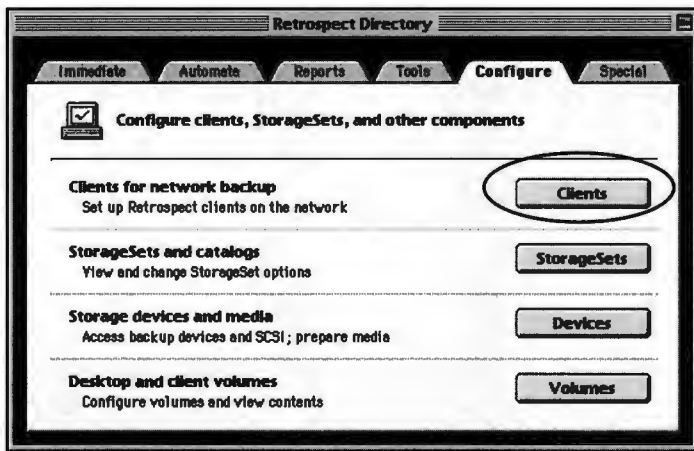


FIGURE 8-113: Viewing the Retrospect client from the workstation.

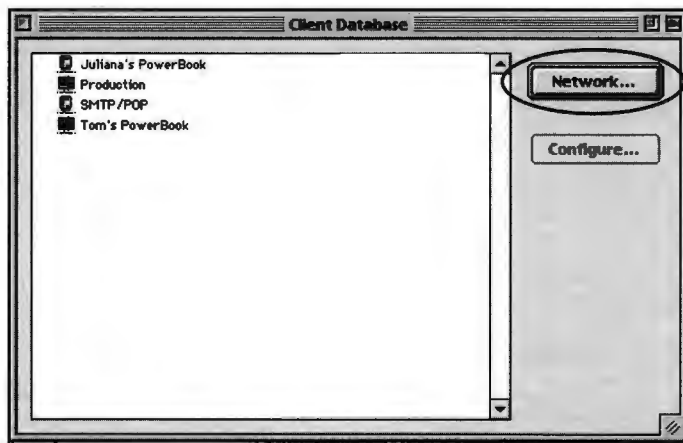
Next, launch Retrospect and select the **Configure** tab in the Retrospect Directory window. Here, press the **Clients** button.



---

FIGURE 8-114: Configuring clients within Retrospect.

If there are any clients already configured on your network, they will appear in the Client Database window. To find newly installed but not yet configured clients, press the **Network** button.



---

FIGURE 8-115: Previously activated clients in the Client Database window.

Retrospect can back up Mac OS computers over either AppleTalk or TCP/IP, and Windows-based computers as well.

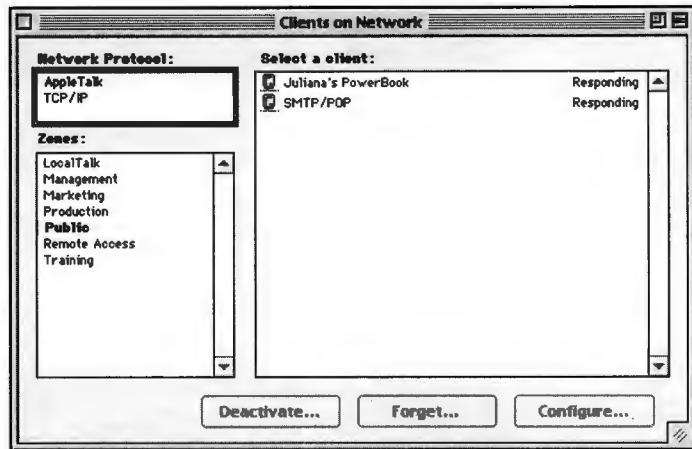


FIGURE 8-116: Searching for AppleTalk-based Retrospect clients.

You can configure clients to back up only certain folders or volumes, but it is usually best to back up entire hard disks. That way you can restore entire volumes should the hard disks on which they reside fail.

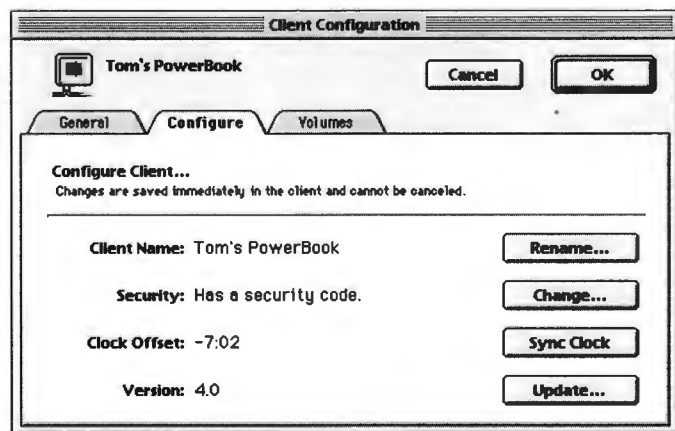


FIGURE 8-117: Configuring a Retrospect client.

Once the workstations have been activated with a serial number and added to the Client Database, they can be added as sources to the backup script as easily as if they were local server hard disks.

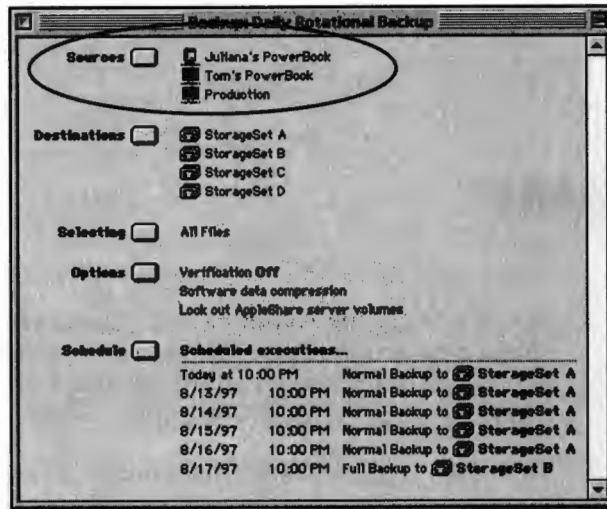


FIGURE 8-118: Adding workstations as sources in the backup script.

Imagine that one of these workstation hard disks has crashed. You can have its user up and running again in minutes.

1. Install a new hard disk.
2. Install a basic System Folder.
3. Install a Retrospect Client into the System Folder.
4. Restore the workstation's last backup onto the new hard disk via the network.
5. Throw away the basic System Folder and boot from the old one.

The user will have lost whatever data was created between the time of the last backup and the hard disk crash, but that is all. All other documents, applications, system preferences, and file sharing access privileges can be restored.

This method works nicely when installing new workstations as well. Configure one workstation the way you want it. Back it up. Restore this backup to other new workstation hard disks. Then all you have to do is “tweak” the new computers with the correct user names, software serial numbers, and network configurations.

## SUMMARY

In order to use the AppleShare IP Client, users’ workstations need to be configured to use Open Transport networking. This may require the additional configuration of AppleTalk and TCP/IP. Users may then install the AppleShare IP Client from diskette or from a server volume.

To use the AppleShare IP Client properly, users need to be familiar with the server log-on process and AppleShare access privileges. They will also find it helpful to understand the use of Personal File Sharing, Personal Web Sharing, Web browsers, email clients, network printers, and server-based print queues.

Basic user support involves the configuration of server share points as well as the establishment of user and group accounts. Server volumes should be shared with security and user convenience foremost in mind.

The behavior of the AppleShare IP client can be modified using a special setup utility.

A lot of software must be installed and properly configured on user workstations if users are to take full advantage of the AppleShare IP server. Fortunately, advanced networking tools such as Datawatch’s netOctopus, Neon Software’s LANsurveyor, and Wave Research’s File-Wave/Asset Trustee make this work easy. The work can be protected by extending Dantz’ Retrospect to perform workstation backups.



# Server Manager

If you are using one server to support a small group of users, AppleShare IP Manager and its modules might be all you need to manage that server. However, if you have more than one AppleShare server or manage more than two dozen user accounts, you will want to step up to *Server Manager*.

Server Manager, created by Santorini Consulting and Design, Inc., makes it possible for administrators to manage multiple AppleShare 3.x and 4.x and AppleShare IP servers from a remote Macintosh. It permits access to the same control functions that AppleShare Admin and AppleShare IP Manager do and adds a good many more. While this appeals to administrators of larger networks in particular, many workgroup administrators also prefer to use Server Manager over Apple's AppleShare applications because of its attractive interface and expanded capabilities.

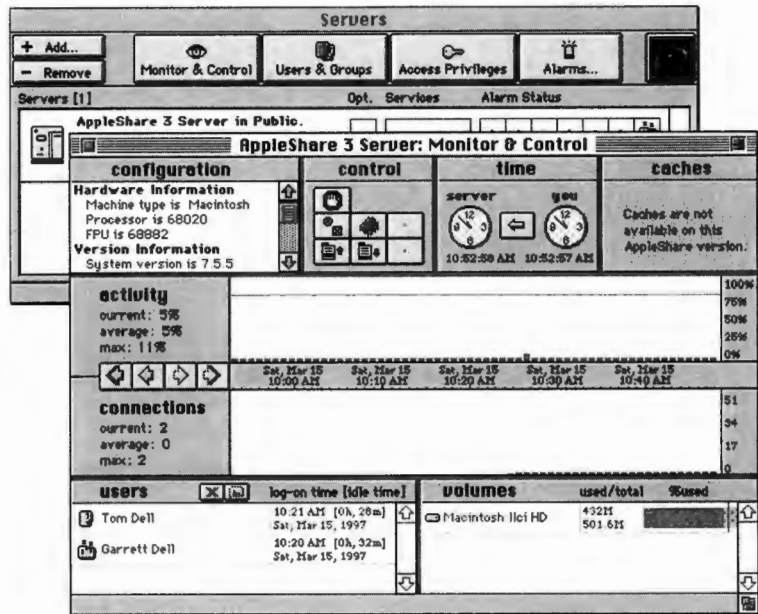


FIGURE 9-1: Server Manager's feature-rich interface.

Among Server Manager's capabilities are:

- The ability to detect AppleShare bombs, low hard disk space, inconsistent clocks, overdue backups, idle users, excessive file transfer activity, and other problems. In some cases Server Manager can respond automatically when problems are detected. For example, it can disconnect idle users after a given time. In other cases it can notify you with audible alarms, dialog boxes, email messages, or pager calls.
- The ability to log important server events continuously and make this information available for analysis in a tab-delimited text file. This supplements the extensive information Server Manager displays on screen, as shown in Figure 9-1.
- The ability to perform basic tasks remotely, such as starting and stopping services, adding and editing user and group accounts, changing AppleShare preferences, and rebooting the Macintosh server. In

addition to being convenient, Server Manager can provide a new level of host security. For the ultimate in safety you can remove your servers' keyboards and monitors and lock the CPUs away in data closets. When you need to work with them, you can do so from your own desktop.

- The ability to manage multiple servers as a whole. You can work simultaneously with each AppleShare server you have in Server Manager. You can even copy and paste users and groups between one AppleShare server and another.
- The ability to manage everything from one console. If you are not altogether thrilled with Apple's OpenDoc paradigm and prefer to launch one application instead of seven, Server Manager permits you to stick with one familiar interface.

If you purchased an Apple Workgroup Server in the past few years, you might find that you already have Server Manager. Its installation CD-ROM is bundled with Apple servers. If you do not have Server Manager yet, read through this chapter to find out if its features are right for you.

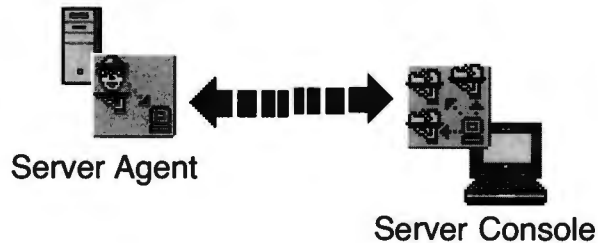
## INSTALLING SERVER MANAGER

Server Manager has two components that you will find on the installation CD-ROM. The first is the *Server Console* application, which is installed on either an AppleShare server or a desktop Macintosh. The second is the *Server Agent* application, which must be installed on all of the AppleShare servers you wish to administer remotely. There is one version of the Server Agent for AppleShare 3.x or 4.x servers and another for AppleShare IP. (The installation CD-ROM also includes the QuickMail Quick-Messenger System Extension. If you wish to receive alerts via CE Software's QuickMail email system, you can install this on the computer running Server Manager.)

How you install these components depends on how you intend to work with them. You must install the Server Agent on all of the AppleShare



servers you will be managing. The Server Console can also be installed on your AppleShare servers, in which case its Monitor & Control window (Figure 9-1) will give you a better idea of what is going on than AppleShare's windows will. Alternately, you can install the application on a remote Macintosh, in which case you will be able to find out what is going on with the servers throughout your organization without getting up from your desk. I recommend that you do both.

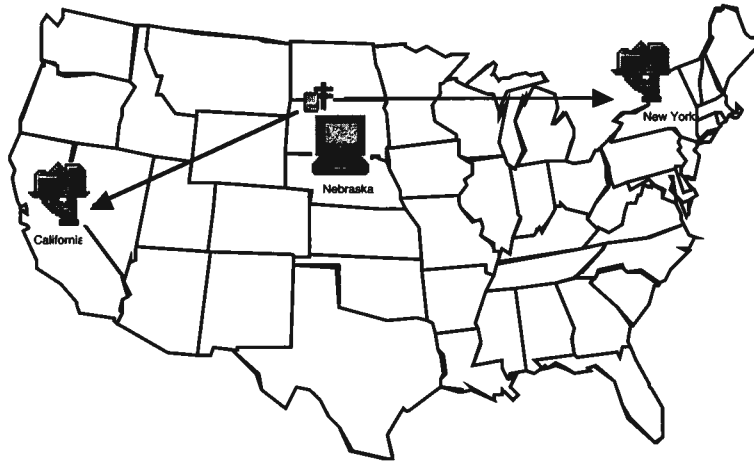


## Installing Server Console

Server Console runs under System 7.0 and above. It requires 1,500 Kbytes of RAM and takes up 1.5 Mbytes of hard drive space. Install it on a Macintosh with at least a 68030 processor, such as an SE/30 or a IIci.

I recommend that you install one copy on each AppleShare server and leave it running there full-time so that it can notify you if problems occur. I further recommend that you install a copy on your desktop Macintosh. You can leave it running to monitor the workings of all your network's AppleShare servers, or you can launch it only when you have a specific task to perform.

I keep a copy on my PowerBook. This gives me the ability to roam about without losing the capability of managing my company's servers or those of my clients. Server Manager even works over ARA. I have often added user accounts to my servers from a hotel room or have analyzed the servers of a client located half a continent away.



## Installing Server Agent

Server Agent and Server Agent IP require about 1,200 Kbytes of RAM and take up less than 500 Kbytes of hard drive space. Server Agent runs under System 7.0 and above; Server Agent IP runs under System 7.6 and above (since that is what AppleShare IP requires).

You can install the appropriate version of Server Agent anywhere you want on a server's hard drive, but I recommend that you put the application or an alias of it in the Startup Items folder of the System Folder so that it launches itself whenever the servers are restarted.

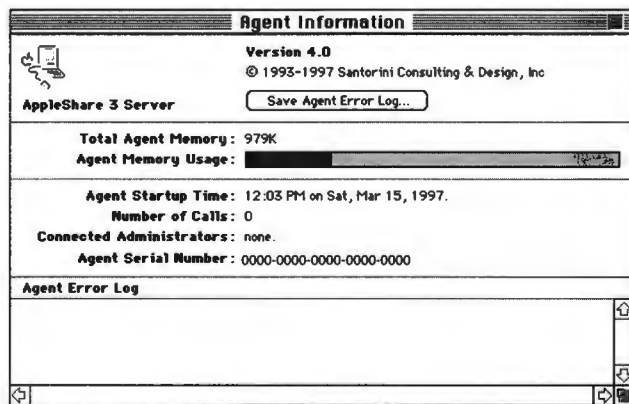
You must shut down AppleShare 3.x/4.x for a few minutes in order to install Server Agent, because Server Agent installs many disabled user and group accounts in order to give itself administrator access to AppleShare later on.

Once you have copied Server Agent to the server's hard drive, launch it. You will be prompted to enter the file server's Admin Key (the same password you use to open AppleShare Admin or AppleShare IP Web & File Admin) as well as a serial number. You need a unique serial number

for each Server Agent you deploy. Press the **Register** button when you are done.



If Server Agent has been correctly installed, the Agent Information window will open, as shown in Figure 9–2.



---

FIGURE 9–2: The Agent Information window.

You may then launch AppleShare.

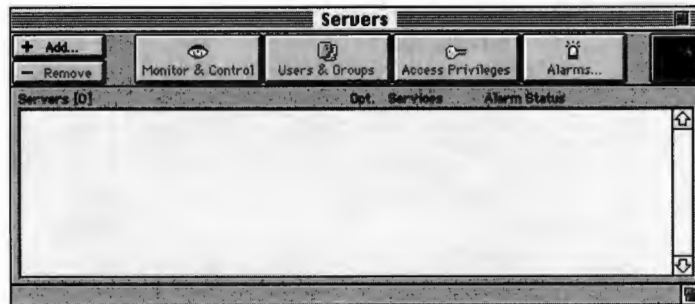
## USING SERVER MANAGER DAILY

In previous chapters I showed you how to use Santorini's Server Manager and Server Tools applications for specific server administration tasks. Here I will go a bit deeper and show you how to use Server Manager's monitoring capabilities on a daily basis.

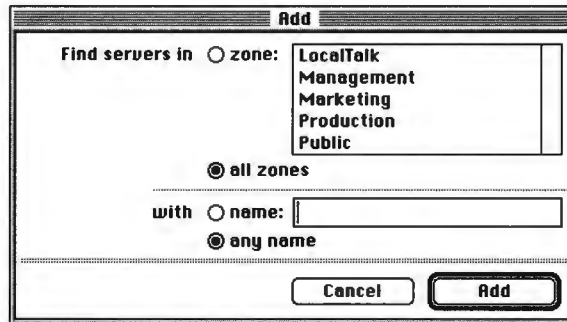
The way you configure Server Console for day-to-day use depends on whether you are running it on your servers locally or at your desktop remotely. Either way you will begin by working with the Servers window.

### Using the Servers Window

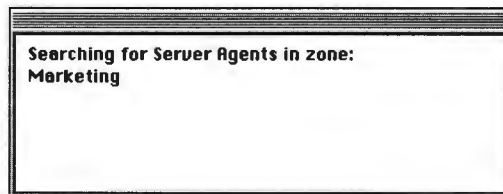
When you first launch Server Console it will not know which AppleShare servers contain Server Agent. You need to seek out this information by pressing the **Add** button in the Servers window.



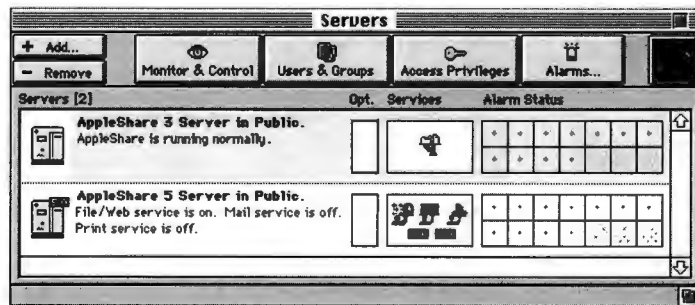
This will open a dialog box in which a list of zones found on your network appears. If you wish to work with only one server, select the zone in which it resides and enter that server's name in the **name** field. When you first use Server Console, however, it is a good idea to make sure all of your Server Agents are properly installed and responding by choosing both the **all zones** and **any name** radio buttons. You may then press the **Add** button to proceed.



Server Console will search the network for its Server Agents.



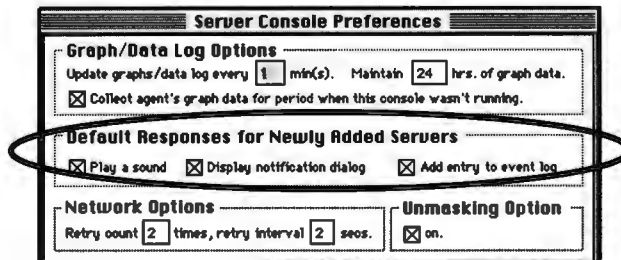
The Server Agents it finds will appear in the Servers window.



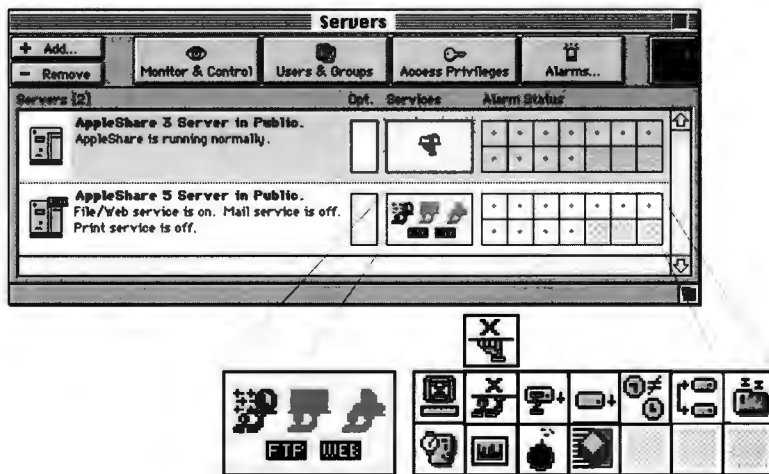
Verify that all of your Server-Agent-equipped servers appear in this window. You may then remove any you do not wish to work with at the moment by selecting them in the Servers window and pressing the **Remove** button. This terminates the communication between Server Console and its Server Agents. The connection can be restored using the **Add** button again.



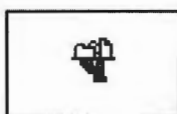
You can direct Server Console to inform you when a server it has been out of contact with returns to service. This is done in the Server Console Preferences window accessed through the **Server Console Prefs** command under the **Edit** menu bar item.



The **Server** window tells you what is going on with your servers at a glance.



The list item for each server varies depending on whether it is running AppleShare 3.x/4.x or AppleShare IP. When all is well you will see the message “AppleShare is running normally” or “File/Web service is on.” Each list item also displays an icon for each service running on your server at any given time. On AppleShare 3.x/4.x servers, this will only be AppleShare, but on AppleShare IP servers, you can see which of the three primary applications are running: File & Web Server, Mail Server, and Print Server. You can also see if the File & Web Server’s FTP and HTTP (Web) functions are enabled. A service that is not running is grayed out (see the Print Server icon in the illustration).



AppleShare

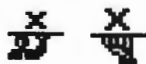


AppleShare IP

If all is well, the Alarm Status pane is empty. When problems occur on a given server, its Server Agent reports them to Server Console, which then displays an icon in the Alarm Status pane. These icons denote the following situation or occurrences.



**Server is down.** When you see this alarm it means that the server Macintosh has crashed, has been shut down, or has become disconnected from the network. You will need to visit the server to find out which.



**Service/AppleShare has been shut down.** When you see this alarm it means that the AppleShare software is not running. In the case of AppleShare IP, this could be the File & Web Server, Mail Server, or Print Server. In the case of AppleShare 3.x/4.x, it means only AppleShare File Server. The software could have bombed or someone might have quit out of it. You can restart it from Server Console, as I will show you further on.



**Total free disk space has fallen below 10%.** This alarm means that the server’s cumulative free disk space is less than a given percentage. Low disk space can cause crashes in applications that write temporary files to the hard disk as they run. This is a particular danger when the server is running a print queue. It can also cause errors when users attempt to copy files to the server. The threshold for triggering this alarm is user-definable from 1 to 50 percent.



**Free disk space on any volume has fallen below 10%.** This alarm is the same as the previous one except that it pertains to individual volumes. Whenever you see either of these alarms, you should delete unnecessary files from the server to bring it back under the threshold, which is user-definable from 1 to 50 percent.

The threshold you select should depend on the size of the server's hard disk. If the server has a 500-Mbyte hard drive, the default setting will not make you aware of a problem until you are down to 50 Mbytes free space. It would only take a couple of users copying today's 20–30-Mbyte applications up to the server to deplete all the hard disk's space. A threshold of at least 20 percent would be better.

If the server has a 4-Gbyte hard drive, the default setting will make you aware of a problem when you are down to 400 Mbytes of free space. That should give you plenty of time to delete files or add storage space.



**Server time is off by 30 minutes.** If you see this alarm, it means that the server and the Macintosh on which you are running Server Console are out-of-sync by a given number of minutes. Out-of-sync server times can confuse backup systems and users who depend on modification dates for document version control. You can correct this inconsistency with Server Console, as I will show you further on. This threshold is user-definable from 1 to 60 minutes.



**Backup is overdue by 100 hours.** If you see this icon it means that your server's hard disk has not been copied to backup media in a given number of hours. You will need to launch your backup software to find out why. This threshold is user-definable from 5 to 500 hours (21 days). The default setting takes weekends into account, a period of at least 48 hours when you might not back up the server. I believe in backing up servers each and every day, so I set this to 12 hours. Then I know if the backup failed the night before.



**Users/guests have been idle for 30 minutes.** This alarm tells you that people who have been logged on to the server for a given amount of time are not using it for anything. Although harmless, these connections do contribute to the operational overhead of the server and usually should be closed. This can be done with Server Console, as I will show you further on. This threshold is user-definable from 15 to 2,760 minutes (46 hours).





**Users/guests have been connected for 3/1 hours.** This alarm tells you that people have been logged on to the server for a given period of time without logging off. This could signal a security breach, as someone who is not authorized to be on the server might be able to use these Macintoshes' connections to gain access when their owners are away. They can be logged off with Server Console, as I will show you further on. This threshold is user-definable from 1 to 200 hours (8 days).



**Server activity has been more than 80% for 1 hour.** If you see this alarm, the server might be overworked. Short bursts of high activity are expected with a server, but prolonged high activity slows network traffic and reduces the life span of storage media. You can use Server Console to determine how you might best redistribute files for load balancing. This threshold is user-definable from 25 to 100 percent and from 1 to 10 hours.



**Service/AppleShare error has occurred.** When you see this alarm it means that the AppleShare software is having problems but is still running. The file server application may be very low on memory, there may be corrupted files on the hard disk, or the application may have “hung.” You will probably need to restart the server, which you can do with Server Console, as I will show you.



**RAID error has occurred.** When you see this alarm it means that a problem has occurred with Apple RAID—the server's mirrored drives may be out of sync, for example. You will need to launch the Apple RAID software on the server to identify and correct the problem.

The settings I showed you here are the defaults. Many of them can, and probably should, be changed to meet your particular needs. There are also several other procedures that Server Manager can follow when an error occurs besides just displaying an icon in Server Console. You can establish what parameters will trigger an error message, and what Server Manager will do about it, by pressing the **Alarms** button in the Servers window (or by choosing the **Alarms** command under the Servers window's **Servers** menu bar item).

## Alarms



The Alarms window has three basic components: a check box that enables or disables a given alarm; a field in which to specify what event characteristics will trigger an alarm, where applicable; and a **Respond by** button, which will take you to a list of possible automated alarm reactions.

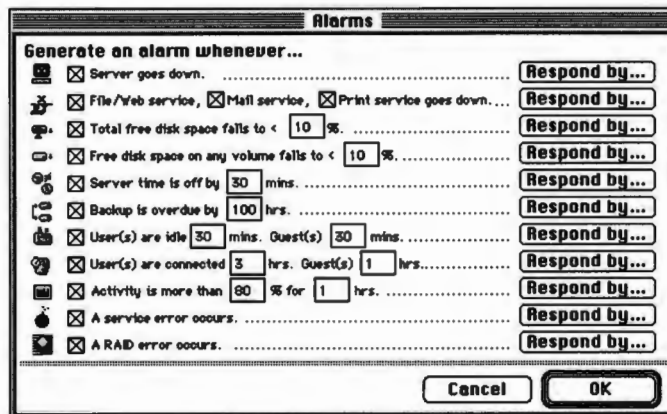


FIGURE 9-3: The Alarms window.

I explained what Server Manager's alarms mean. Now let me show you how you can program Server Console to respond to them.

When you press the **Respond by** button next to a given alarm setting (Figure 9-3), the Responses window opens. Here you can use the check boxes to enable and disable various reactions. Double-click on any list item (or select an item and press the **Options** button) to make further choices.

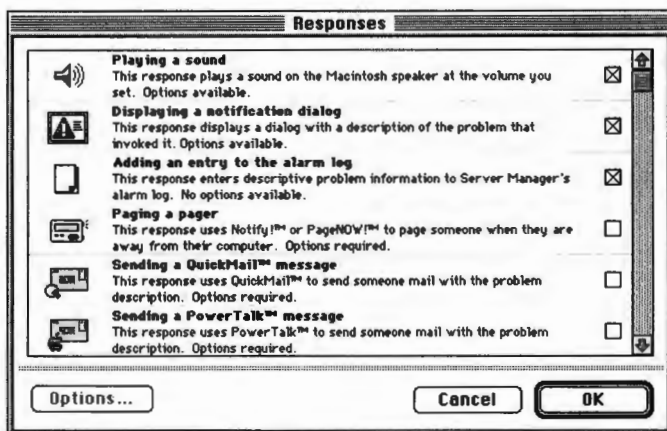
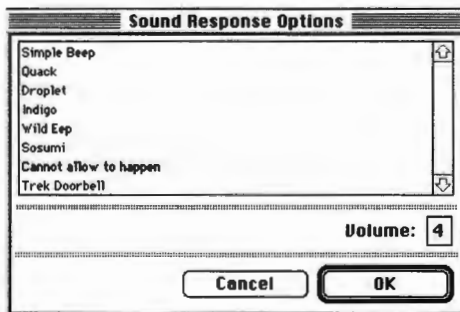


FIGURE 9-4: The Responses window.

These responses include the following.



**Playing a sound.** The most typical response to any error on a Macintosh, this check box is enabled by default. It causes Server Console to play a System 7 sound at the volume you specify whenever a problem occurs, which is useful if you have Server Console running on servers that are within earshot or on a monitor machine. You can choose the sound that is played by double-clicking on this list item or selecting it and pressing the **Options** button.



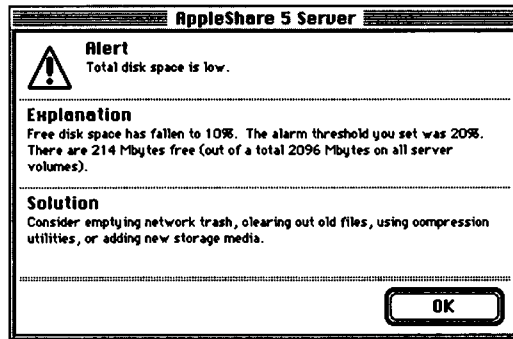
Whenever I hear the voice of HAL from *2001: A Space Odyssey*, I know I have problems. I use this only on a nearby dedicated monitor machine, because it is too annoying at my desktop.



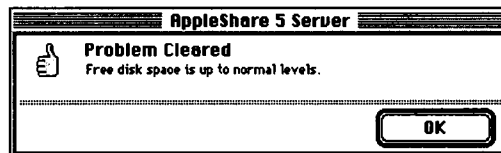
**Displaying a notification dialog.** Another typical Macintosh response, this feature is also enabled by default. It is useful if your AppleShare servers are within sight and if you have Server Console running in the background while you are doing something else on your desktop Macintosh. In the latter case, Server Console will flash a warning icon over the Finder.



When you switch Server Console to the foreground to see what is wrong, it will show you the dialog box in which the problem and a suggested solution are described.

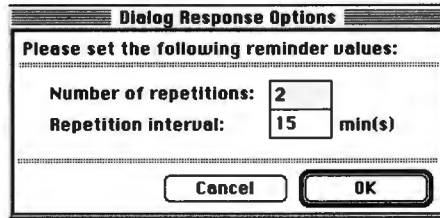


When you solve the problem you are rewarded with this dialog box:



This feature has its uses, but, to be honest, I find it irritating. The icons in the Server window are enough of an attention getter for me, so I disable this feature for all but **Server goes down**.

If you decide to use this feature, you can choose whether or not these dialog boxes will be displayed repeatedly and at what intervals.



**Adding an entry to the alarm log.** This check box is also selected by default, and I recommend that you leave it enabled. It will record which error occurred, on which server, and when.

To view this record, select **Open alarm log** under Server Console's **File** menu bar item.

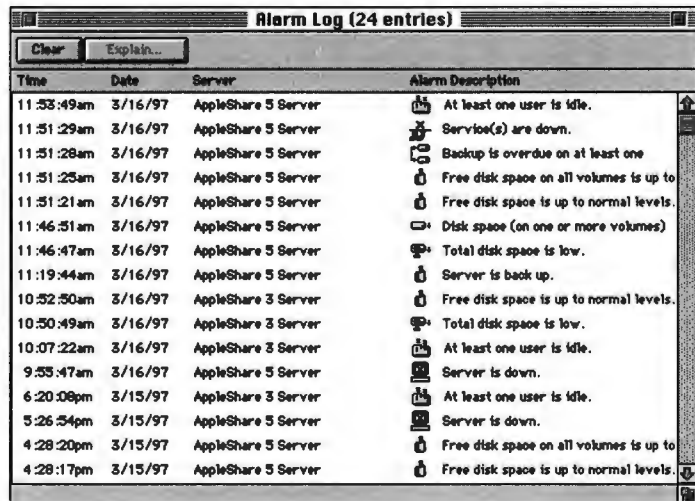
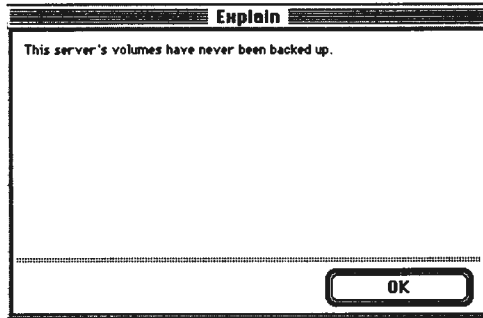


FIGURE 9-5: The Alarm Log window.

Double-click on any item in the Alarm Log window (or select it and press the **Explain** button) for a description of that problem.

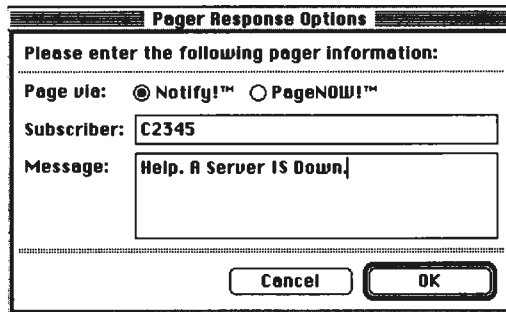


Press the **Clear** button to empty the alarm log. You can also export this log as a tab-delimited text file by choosing the **Export** command under the **Alarm Log** menu bar item that is available when the Alarm Log window is open.

There are no options to set for this alarm response.



**Paging a pager.** This response is useful if you roam about a building or campus and carry a pager. It requires that you have either the Notify or the PageNOW service and software. To enable it you must set its options to tell Server Console which software you use, what your subscriber ID is, and what it should say to you when triggered.



**Sending a QuickMail message.** If your organization uses CE Software's QuickMail and you have the QuickMessenger System Extension installed on the Server Console Macintosh, you can direct Server Manager to email you a message when there is a problem on one of the servers. Better still,

you can select multiple recipients for emergency email messages from any of QuickMail's MailCenters, including gateway MailCenters.



**Sending a PowerTalk message.** If your organization has never invested in an email system, you can still use this feature by deploying Apple's no longer supported but free PowerTalk peer-to-peer email system. Simply install PowerTalk on your servers and on your desktop machine so the Server Console applications on each server can use *Apple Open Collaboration Environment (AOCE)* to send you a message each time a problem occurs. Like QuickMail, PowerTalk can use Internet and pager gateways to notify you of problems when you are away from your LAN.

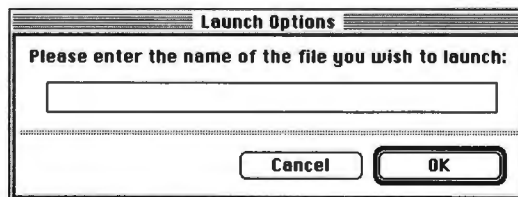


**Speaking a message.** If you enable this feature, Server Manager will make use of the Macintosh's speech technology to tell you verbally when there is a problem. This is more useful than the simple beep.



**Launching a document, script, or application.** Beyond simply informing you about a problem, Server Manager also gives you the ability to do something about it with this powerful item. For example, you could direct Server Manager to launch a document when the AppleShare application is quit that might describe just how much trouble the user who quit AppleShare is going to be in if the server does not come back up fast! A more serious example: You might direct Server Manager to run an AppleScript that deletes certain expendable files when the server runs low on hard disk space. Finally, you can direct Server Manager to launch an application when a threshold is met, perhaps Dantz's Retrospect or one of Santorini's Server Tools.

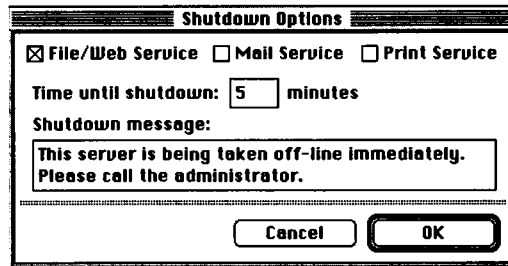
To use this feature, type in the exact name of the file you wish to launch remotely on the server Macintosh.



**Shutting down file service.** This is a feature you should seldom need, but it is good to have in an extreme emergency. For instance, if you have a relatively empty hard disk on the server and suddenly the low disk space

alarm is triggered, you might be the victim of a denial of service attack, wherein a vandal is uploading massive amounts of garbage to your anonymous FTP folder to force a server crash. You can use this feature to beat him to the punch and bring the server down gracefully. Equally dangerous, something might have gone drastically wrong with your RAID volumes. This feature lets you pull the server off-line until you can fix it.

You have the option of giving users a few minutes in which to get off the server by sending them a message.



The previous responses are available to all alarms. There are a few more available only to specific alarms.



**Synchronizing the clock.** If you enable the **Server time is off by...** check box, this response becomes available. It allows you to automatically synchronize your servers' clocks with that of your Server Console Macintosh. Obviously, make sure the Date & Time Control Panel on the remote Macintosh is set correctly. Also, do not enable this feature with servers that are in different time zones.



**Sending a message to and/or disconnecting the user(s).** If you enable the **User(s) are idle...** or **User(s) are connected...** check boxes, this response becomes available. With it you can send a message to users who are idle beyond the time parameters you specify, and you can log them off.



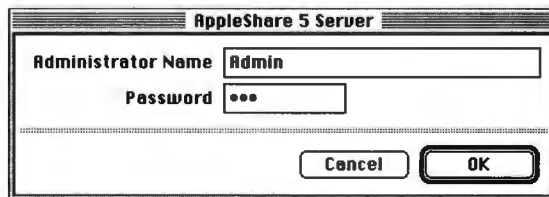


The Servers window tells you the basic condition of all the AppleShare servers on your network. For more details about the condition of a specific server, select it in the Servers window and press the **Monitor & Control** button (or choose the **Monitor & Control** command under the Servers window's **Servers** menu bar item).

## Monitor & Control



You will be asked to supply the server's Admin Key before being presented with the Monitor & Control window.



The Monitor & Control window provides a constant display on the overall workings of any server you select, permitting you to perform commands on it. If you think of the Servers window as being like a car's

dashboard warning lights, the Monitor & Control window can be thought of as the actual dashboard.

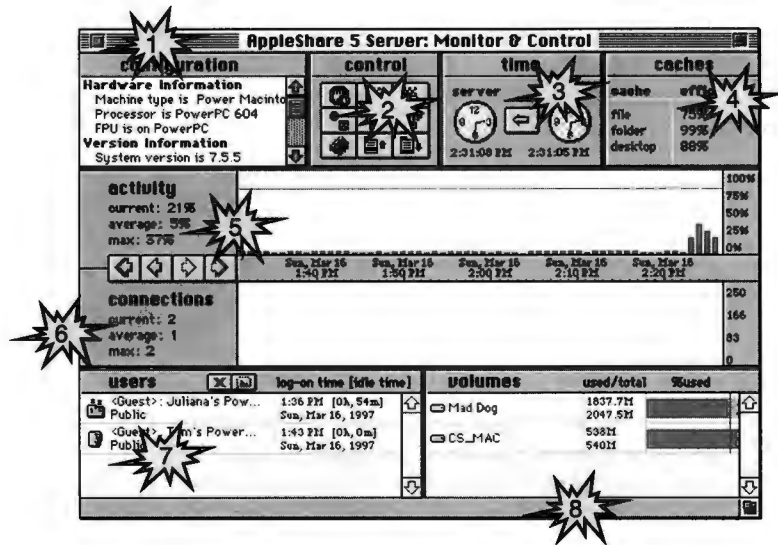
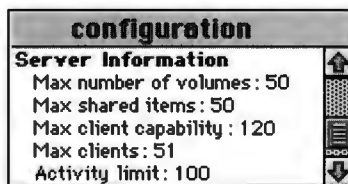


FIGURE 9-6: The Monitor & Control window.

The Monitor & Control window's parts follow.



**Configuration pane.** This pane provides you with general information about the server Macintosh, such as its hardware, system software, and memory specifications.

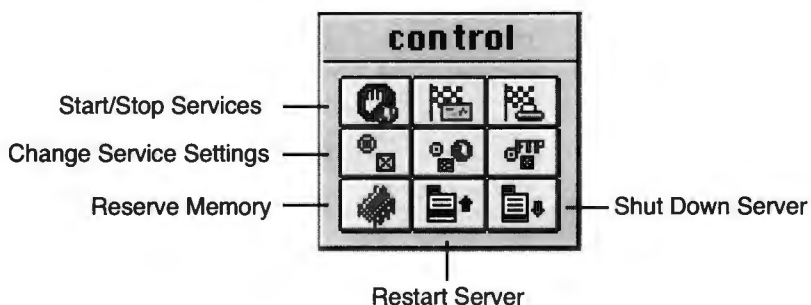


It will also tell you the server's limitations, which will vary between AppleShare 3.x, AppleShare 4.x, and AppleShare IP servers. These limita-

tions should be taken into consideration when you redistribute workloads across servers.



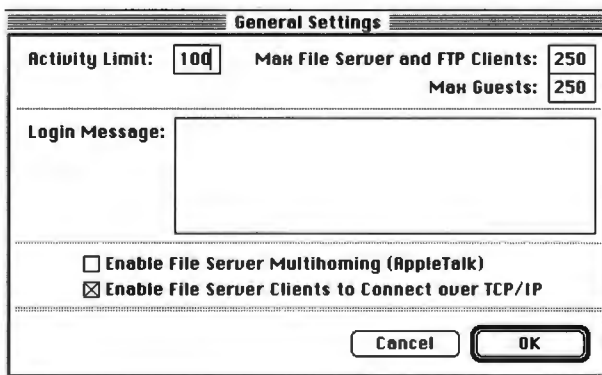
**Control pane.** The contents of this pane vary between AppleShare 3.x/4.x and AppleShare IP servers. For AppleShare IP servers, they are as follows:



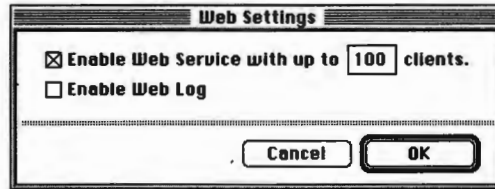
With this pane, many of the actions for which you would use AppleShare File & Web Server Admin or AppleShare Admin can be performed without your being anywhere near the server.

Use the buttons across the top of this pane to start and stop AppleShare IP services. In so doing, you toggle between a racing flag icon (start service) and a stop sign icon (stop service).

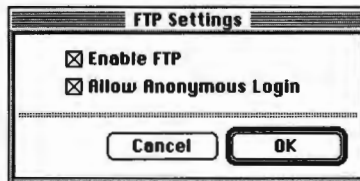
Use the first button in the second row to set file service preferences.



Use the middle button to set Web service preferences.



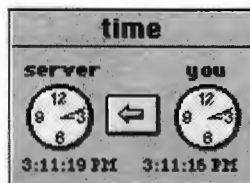
Use the button at the end of the middle row to set FTP service preferences.



Here's a neat trick. If you have trouble with users quitting out of AppleShare on your servers, don't use the AppleShare application. In the case of AppleShare 3.x/4.x it is not the AppleShare File Server application that provides service but the File Server Extension (System Extension). In the case of AppleShare IP it is not the AppleShare IP Web & File Server application that provides service but the AppleShare IP Web & File Server Extension (System Extension). Therefore, you can use Server Manager to launch file sharing on a remote server without giving anyone sitting at the server Macintosh any indication that it is running or any visible means of shutting it off!



**Time pane.** This pane displays the time as it is seen by both the server and the Macintosh on which you are running the Server Console. If you have not set the alarm response to synchronize the clocks automatically, you can do it manually by pressing the arrow button here.



You should only have to do this occasionally, perhaps when Daylight Savings Time takes effect. If you find the server's clock is a long way off whenever you access it, you probably need to replace the battery on its logic board, which powers its Parameter RAM (PRAM).



**Caches pane.** This pane is a performance indicator that keeps track of how well AppleShare IP is using the server's RAM to cache file, folder, and desktop data for fast access.

caches	
cache	efficiency
file	75%
folder	99%
desktop	88%

Caching is something you will need to watch over time. The more RAM you can allocate to caching, the better. For maximum performance, reserve only as much RAM as is absolutely necessary for other server-based applications, such as Server Agent and Retrospect. This can be set using the **Cache** button in the previously illustrated Control pane.



Cache Settings

Memory to be reserved for other applications:

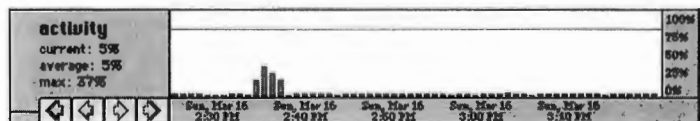
4096

Reset Cache Cancel OK

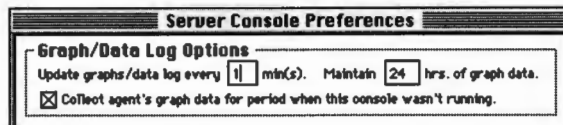


Performance can also be increased by adding physical RAM to the server and turning off Virtual Memory in the Memory Control Panel.

**Activity pane.** This pane gives a graphic view of the server's workings over time. It also displays a red line representing the alarm threshold you set in the Alarms window. The default threshold is 80 percent activity for a period of longer than one continuous hour.



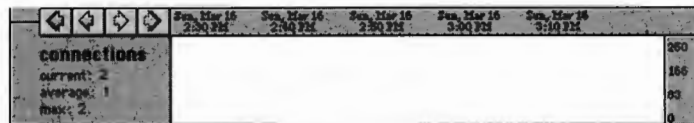
On the left side of the pane you are shown the current percentage of server usage, the mean average of server usage in the last 24 hours, and the maximum peak of usage at which the server has run in the last 24 hours. You can change this measurement interval in the Server Console Preferences window, which is accessible by choosing the **Server Console Prefs** command under the **Edit** menu bar item.



If you increase the data logging period, you may also need to increase the Server Console's memory allocation.



**Connections pane.** This pane provides a graphic view of the number of users that have been connected to the server. The number of currently connected users, the mean average number, and the maximum number are all listed at the left.

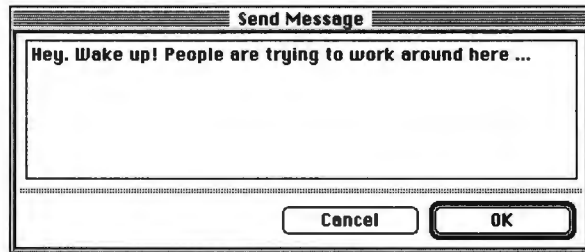


In both this and the previous pane, you can use the arrow buttons to scroll back and forth through the logged data.

**Users pane.** This pane tells you who is logged on to the server, how long they have been logged on, and how long they have been idle (if applicable).

users		log-on time (idle time)
	<Guest>: Juliana's Pow... Public	1:36 PM [2h, 7m] Sun, Mar 16, 1997
	<Guest>: Tom's Power... Public	1:43 PM [0h, 0m] Sun, Mar 16, 1997

Here is a nice feature. Press the **hi** button to send a user a message.



There is no way for the user to send a message back—an omission that some might consider a useful feature. It is always a good idea to use **hi** to warn users of an impending server shutdown.

You can use the **X** button to disconnect a user.



**Volumes pane.** This pane provides information about all the volumes attached to the server (shared or not) and the amount of free space on each. The vertical red line represents the alarm threshold.

volumes	used/total	%used	
Mad Dog	1837.7M 2047.5M	<div></div>	↑
CS_MAC	538M 540M	<div></div>	↓

CD-ROMs look just like hard drives to Server Manager, so do not be surprised if a given server suddenly displays a volume you have never seen. It could be that somebody just put in a different CD-ROM.

All of the commands I just listed can also be accessed through the **Monitor & Control** menu bar item that is available when the Monitor & Control window is open.

At this point you should have a good idea of which AppleShare commands you can execute remotely using Server Manager. For details consult the *Server Manager Manual* (on the Installer CD-ROM).

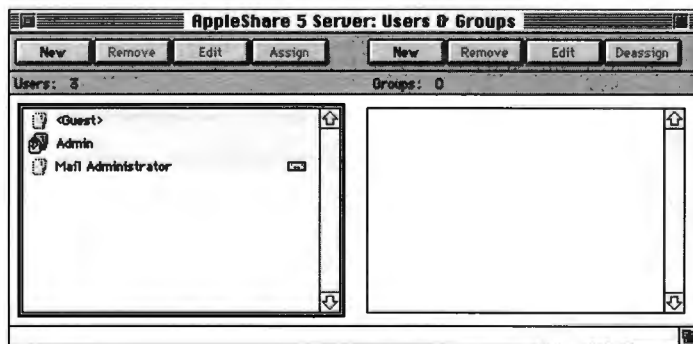
As nice as it is to have all these controls available, you are not likely to use them very often. Most of your server administration time will be taken up with user and group accounts and assigning privileges. Fortunately, Server Manager permits you to do that remotely, too. You can work with a server's accounts by pressing the **Users & Groups** button (or by choosing the **Users & Groups** command under the Servers window's **Servers** menu bar item).

## Users & Groups



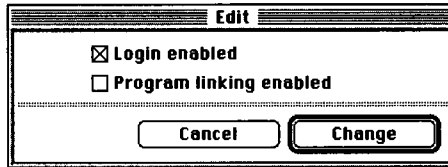
If you have AppleShare 3.x/4.x servers, I recommend that you forget about AppleShare Admin as an option for working with users and groups. What is a fairly ugly procedure under AppleShare Admin is both easy and elegant under Server Manager. The process is improved somewhat under AppleShare File & Web Server Admin, but I still prefer Server Manager because, again, I can do it remotely.

To show you how this works I will go through the process of updating a new AppleShare IP server to honor the Users & Groups list of an older AppleShare 3.0 server. When I open the User & Groups window for the new server it is empty but for the default accounts: "Guest," "Mail Administrator," and whatever the name of the administrator's account is (e.g., "Admin").





First, I need to enable the Guest access account so that anonymous users will be able to get into my Web Folder and anonymous FTP folder. To do this I double-click on the list item or select it and press the **Edit** button. A dialog box appears in which I can enable log-in privileges.



I can gain access to server volumes in my role as administrator using the "Admin" account, but I also want a regular user account for myself. To make one I press the **New** button above the Users list. In the window that opens I can set up all the necessary account criteria.

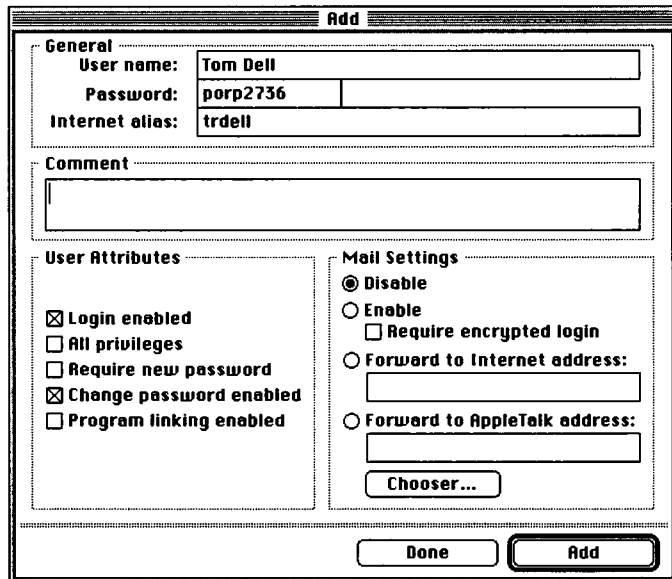


FIGURE 9-7: The Add window.

When I press the **Add** button my new account is added to the User list. Pressing the **Done** button closes the Add User window. (If you have any questions about these settings, refer to the previous chapters.)

Next, I will add my co-workers. I could type in each name in turn, but since I cannot remember the identities of everyone in the organizations and would almost certainly spell somebody's name wrong, I copy the accounts from the older AppleShare 3.0 server. To do this I open both servers' Users & Groups windows, select my co-workers in the first server while holding down the **shift** key, then copy and paste the names into the new server.

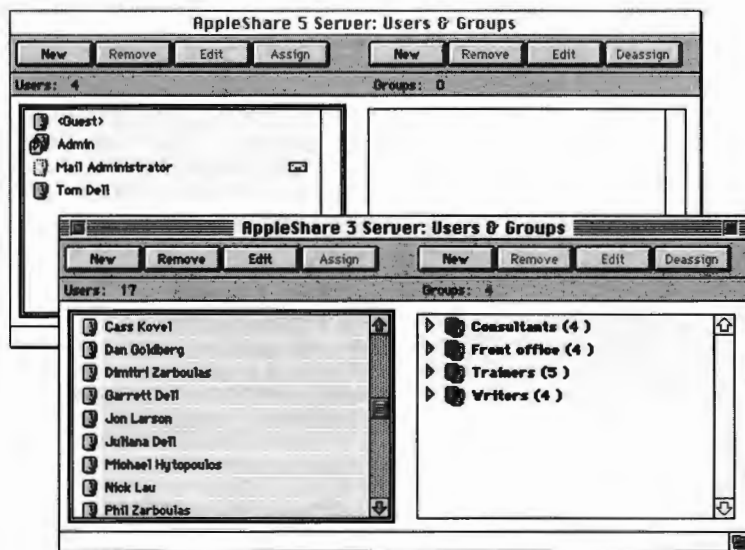


FIGURE 9–8: Copying and pasting user account names.

Of course, AppleShare IP accounts require more data than do AppleShare 3.0 accounts, so I will have to edit the imported user accounts to add an Internet alias, at the very least. I might also need to assign new passwords. I can do both by double-clicking on any list item (or by selecting it and choosing the **Edit** button).

I can import groups as well, but they lose their membership information and are imported empty. To configure these imported groups to match those on the older server, I select their associated users in the User list, highlight the destination group in the Group list, and press the **Assign** button. It helps to have the older server's window in the background with the given group's list item expanded so I can see who belongs to it.

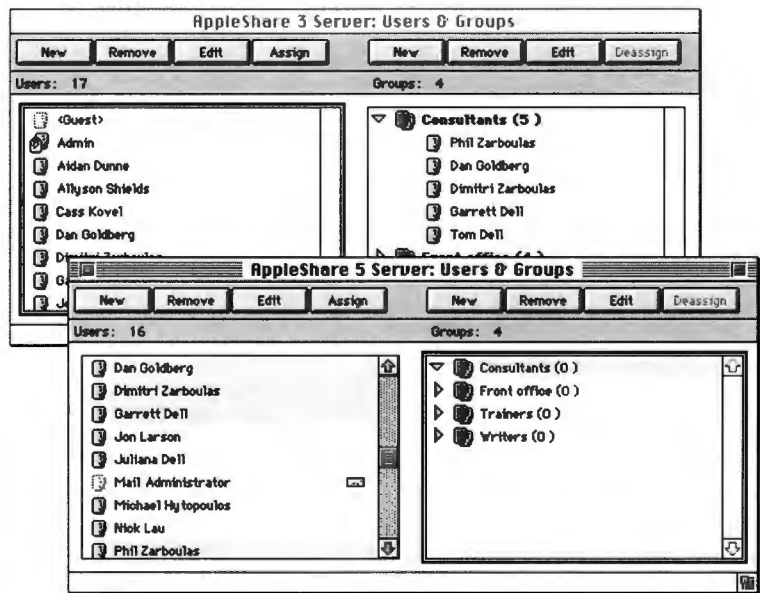
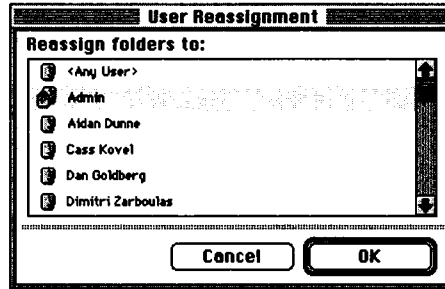


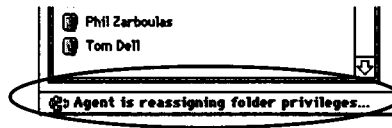
FIGURE 9-9: Assigning users to a group.

Later, if I want to revoke membership, I select a given user and press the **Deassign** button above the Groups list.

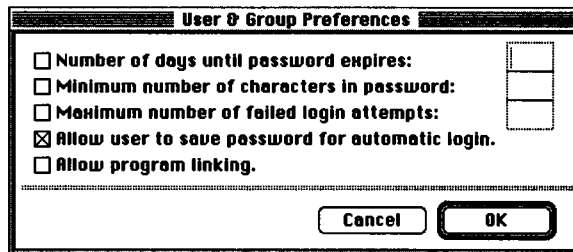
When I want to delete a user or group, I select the account and press the **Remove** button above the User or Group list. I am then prompted to identify the individual who will take responsibility for that user's or group's privileges, with the Administrator account chosen by default.



When you remove a user or group you must wait a few seconds while Server Manager executes the reassignment action. It will tell you when it has finished.



The last step in copying users to my new AppleShare IP server involves making sure I have the same account security restrictions on both servers. I can do this by choosing the **User & Group Preferences** command under the **Users & Groups** menu bar item (shown in Figure 9–10).



Also under the **Users & Groups** menu bar item are commands that permit you to export, edit, and import users and groups in a plain-text or tab-delimited text file (shown in Figure 9–11).

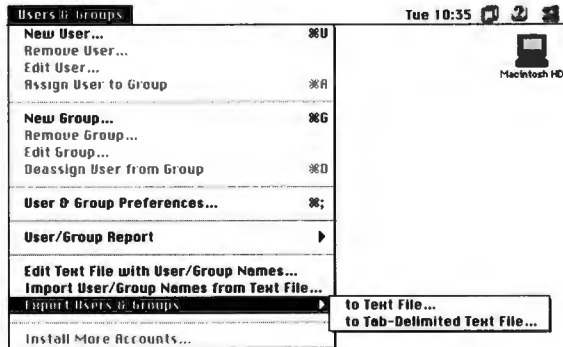


FIGURE 9-10: Importing and exporting users and groups.

This feature is a much better way of moving greater numbers of users and groups between AppleShare servers because, unlike with cutting and pasting, privilege information is preserved (as true or false statements). In addition, you are given an opportunity to edit and correct the names you have exported from one server before importing them into another server.

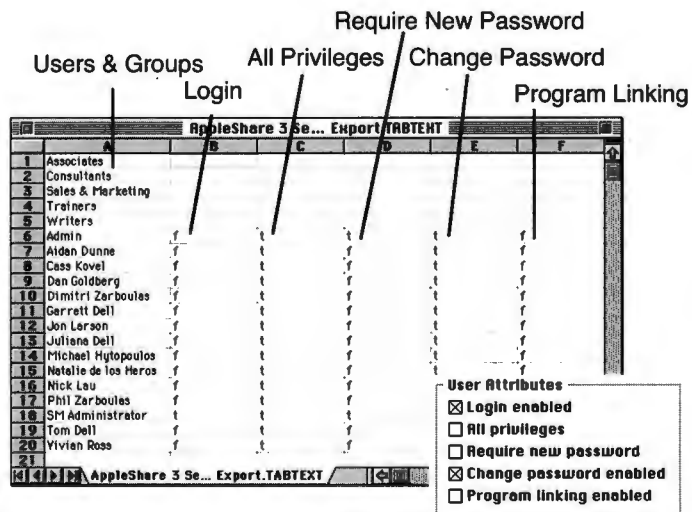


FIGURE 9-11: Editing users and groups in a tab-delimited text file.

This also gives you the ability to export user account names to entirely different applications, such as any other server programs that can import tab-delimited text.

Once you have user and group accounts established, you need to give these people something to log in to. You can do this remotely by pressing the Access Privileges button (or by choosing the Access Privileges command under the Servers window's Servers menu bar item).

## Access Privileges



If you are already logged in to a server with any of its volumes mounted on your desktop, log off (drag the volumes into the Trash) before using the **Access Privileges** command. That way, Server Manager can log in with full privileges and full access.

After you have entered the Admin Key, Server Manager will mount the server's hard drive(s) and open the Access Privileges window.

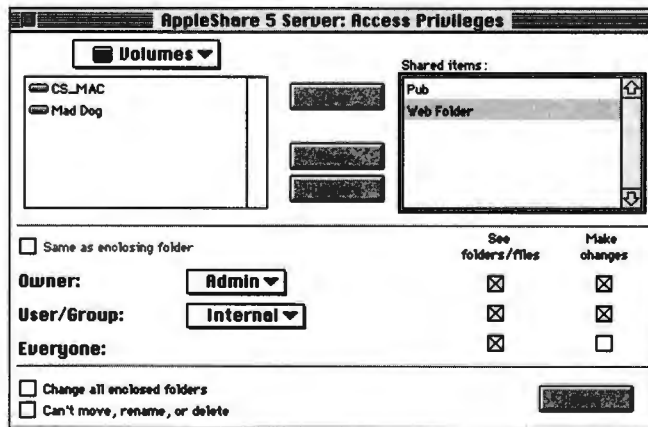


FIGURE 9-12: The Access Privileges window.

This window works much like AppleShare's window for the same purpose. In it you can share and unshare server folders and volumes and designate which users and groups will have access.

If you have any questions about how these privileges work under AppleShare IP, refer to Chapter 4. If you have any questions about how these privileges work under AppleShare 3.x/4.x or Personal File Sharing, refer to *Managing AppleShare & Workgroup Servers* by myself and Dorian J. Cougias (AP PROFESSIONAL, 1995).

## The Santorini Web Site

Before ending my description of the Servers window I should tell you what that last cryptic button is for.



Server Manager's developer, Santorini Consulting & Design, Inc., is named after the Greek island made famous by the fact that it blew up in about 1470 B.C. The button you see is the company logo, a stylized representation of that event. If you press the button, Server Console will send out an Apple event that should launch a Web browser (Netscape's Navigator, Microsoft's Internet Explorer, or Apple's Cyberdog) and take you to Santorini's Web site. You will not find much tourism information there, but you will find data on Santorini's other products as well as software updates.

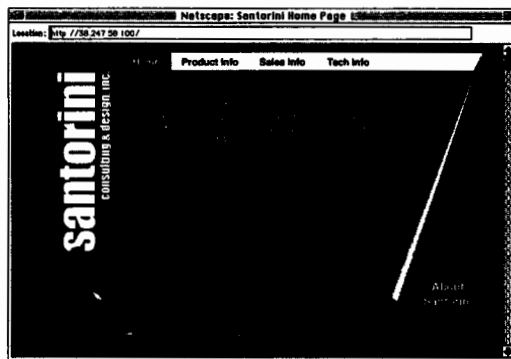


FIGURE 9-13: The Santorini Web site at [www.santorinid.com](http://www.santorinid.com).

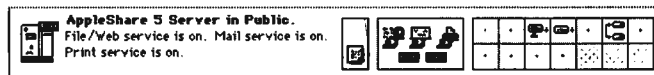
# APPLYING SERVER MANAGER TO SPECIFIC TASKS

Controlling and monitoring the up/down status of your servers and working with users and groups are probably tasks for which you will use Server Manager on a regular basis. Server Manager has other capabilities that you may use occasionally to answer a specific question or perform a particular task.

## Who Has Been Using the Server?

From time to time you might want to determine who has been using your server, when, and how much. You can do so with Server Manager's data logging function. Data logs can be invaluable in locating security breaches, troubleshooting, and analyzing overall system expansion needs.

To begin automatic data logging, select a server from the Servers window and then select the **Enable Data Logging** command under the **Servers** menu bar item. You will be prompted to tell Server Manager where it should store the data log file on your hard drive, and then logging will begin. When data logging is enabled, an icon appears in the Option pane for that server.



The results of data logging can be viewed at any time by choosing the **Open Data Log** command under the **Servers** menu bar item.



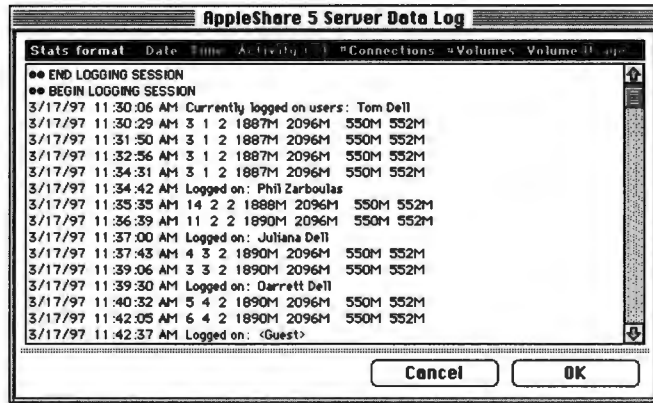


FIGURE 9-14: The Data Log window.

Only the first 32 Kbytes of logged data appear in this window. Server Manager also saves this data as a tab-delimited text file, which can be opened in a word processor or spreadsheet application, such as Microsoft Excel (as shown in Figure 9-15).

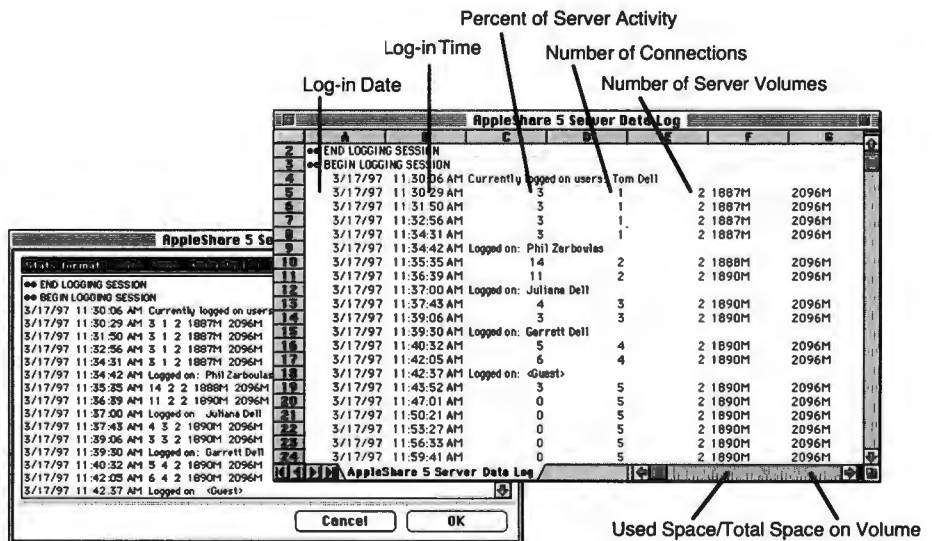
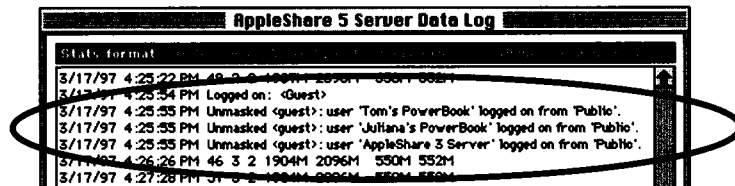


FIGURE 9-15: A typical data log imported into Microsoft Excel.

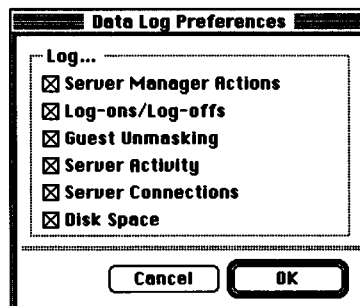
The following can be captured in this log:

- **Server Manager actions.** These are all the actions Server Manager has initiated on the server, such as those made available in the Monitor & Control and Alarms windows.
- **Log-ons/log-offs.** These are all the dates and times when a user or guest logged on to or off of the server.
- **Guest unmasking.** If this option has been enabled in the Server Console Prefs dialog box, you will be able to see what computer and zone a person logged in from, even if they use guest access.



- **Server activity.** This is the percentage of processing power a user has been responsible for consuming in relation to the server's overall processing capacity.
- **Server connections.** This is the number of users who were also logged into the server at the same time.
- **Disk space.** This includes the number of volumes on the server as well as the free space and total space of each.

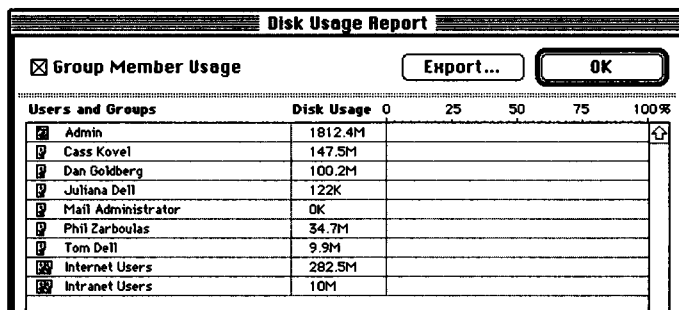
You can determine which of the categories will be logged by selecting the **Data Logging Preferences** command under the **Servers** menu bar item and enabling or disabling the check boxes.



Server Manager gathers information to be placed in the log six times a minute.

## Who Is Hogging the Hard Drive?

When you start to run low on hard drive space it is good to know who is responsible for using most of it so that you may ask them to delete any unnecessary files. This can be done by opening the Users & Groups window, then selecting the **Disk Usage** command in the **User/Group Report** fly-out menu under the **Users & Groups** menu bar item.



Server Manager will quantify the amount of hard drive space taken up by folders and files owned by your users and groups. (If you followed my advice from Chapter 4 and made the Administrator account the owner of all folders, this report will not do you much good.)

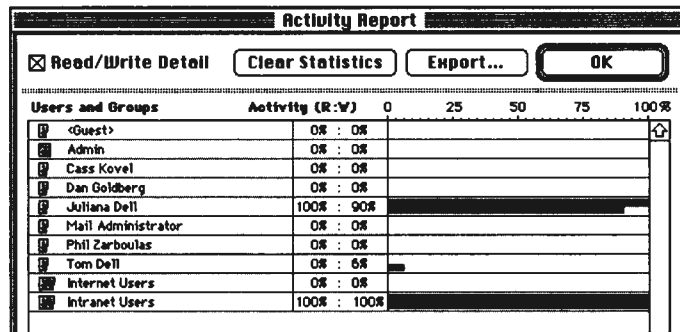
This feature once saved a client of mine a lot of aggravation. It seemed that no matter how big the hard drive he put on the server, its space would get eaten up in a matter of weeks despite the fact that most of the users created nothing but small text files in their work. Finally he used the Disk Usage Report to determine that most users had about 35 Mbytes on the server, but one had about 2.4 Gbytes! It turned out to be the only user in the office whose Macintosh was not equipped with a CD-ROM drive. He was copying the contents of various CD-ROMs up to the server from co-workers' Macintoshes so that he could

access them back at his desktop. He did not know that each CD-ROM could have as much as 650 Mbytes on it and that this is a lot of data.

He has a CD-ROM drive now.

## Who Is Hogging the Processor?

When it seems that your server is starting to bog down, it is good to know who is responsible for using the highest percentage of its available processor bandwidth. It is possible that they are doing something, like running an application off the server, that they can be dissuaded from doing. To generate such a report, open the Users & Groups window, then select the **Activity** command in the **User/Group Report** fly-out menu under the **Users & Groups** menu bar item.



Server Manager will show you which users are responsible for the greatest amount of server activity, and how much of that activity involved copying files to the server versus copying files from the server.

## Scheduling Server Actions

I showed you how an alarm can be used to trigger a Server Manager action, such as launching an AppleScript on a remote server. Server

actions can be triggered by time as well. This is done within the Scheduled Actions window opened by choosing the **Schedule Action** command under the **Servers** menu bar item.

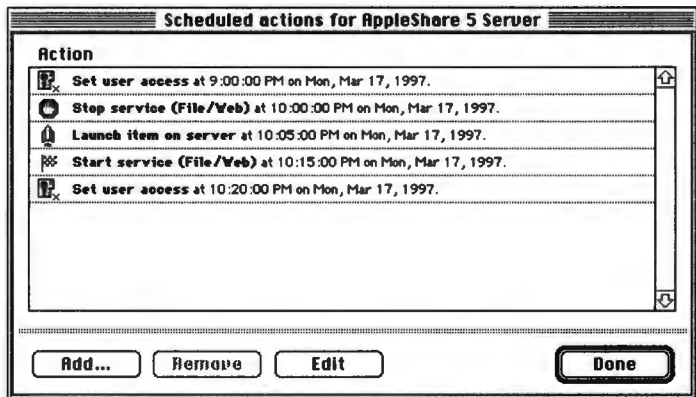


FIGURE 9-16: The Scheduled Actions window.

To schedule the execution of a command, press the **Add** button to open the Schedule Action dialog box.

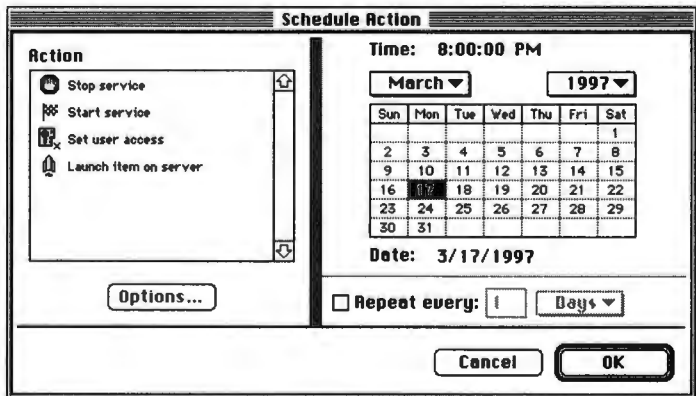
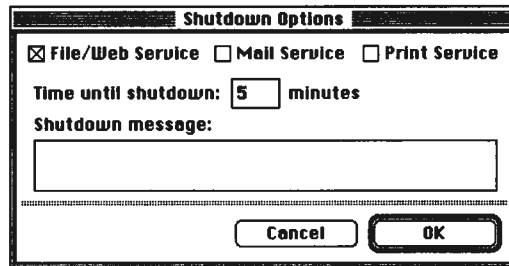


FIGURE 9-17: The Schedule Action dialog box.

Here you can establish the times at which you want specific server-side events to occur, and configure options for several actions. These actions are:



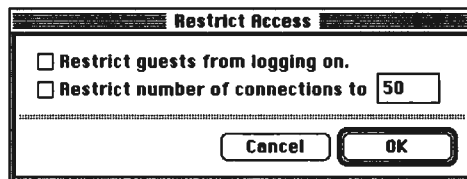
**Stop service.** With this action you can shut down any AppleShare IP service and optionally give users a warning and some time to log off.



**Start service.** With this action you can start up any AppleShare IP service. It works nicely in conjunction with the previous action.



**Set user access.** With this action you can deny access to users of guest access and/or limit the number of client connections overall. This is particularly handy when you are concerned about guest users and you want to deny them access when you are not around. It is also useful in limiting server activity at times when the processor is shared by other applications, such as when a backup script is launched.

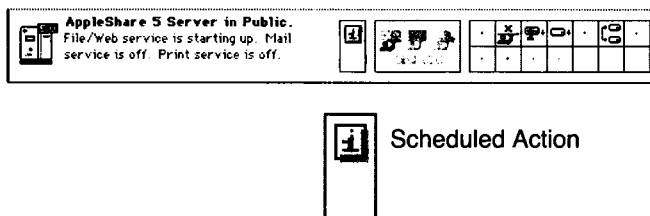


**Launch Item on server.** With this action you can launch a document, application, or AppleScript on a remote server, just as you can with some alarm responses.

These actions work particularly well when used together. For example, you might:

1. Shut down the Mail Server and Print Server to reduce processor load and close open files by using the **Stop service** action.
2. Limit connections to just a few so that server activity is reduced, but access to the Web server is not completely cut off, by using the **Set user access** command.
3. Execute a backup script on the server by using the **Launch item on server** command.
4. Increase the limit of user connections when the backup is complete using the **Set user access** command again.
5. Restart the Mail Server and Print Server using the **Start service** command.

When an action is scheduled, an icon appears in the Option pane for that server in the Servers window.



## SUMMARY

- With Server Manager you can manage multiple AppleShare 3.x/4.x and AppleShare IP servers throughout your LAN or WAN remotely.
- Server Manager is composed of two components: a Server Agent installed on each server and a Server Console installed on a remote management machine.

- You can use Server Manager's Alarms functions to warn you of current or impending server problems, as well as to react automatically to many of those problems.
- You can use Server Manager's Monitor & Control function to start and stop services, configure service preferences, shut down and restart the server Macintosh, and monitor server activity.
- Server Manager lets you manage users, groups and their associated privileges using familiar AppleShare-like windows.
- Server Manager generates reports that can be used to answer configuration and performance-related questions.
- Server Manager can be scheduled to perform server-side actions automatically.



## SUMMARY

- With Server Manager you can manage multiple AppleShare 3.x/4.x and AppleShare IP servers throughout your LAN or WAN remotely.
- Server Manager is composed of two components: a Server Agent installed on each server and a Server Console installed on a remote management machine.
- You can use Server Manager's Alarms functions to warn you of current or impending server problems, as well as to react automatically to many of those problems.
- You can use Server Manager's Monitor & Control function to start and stop services, configure service preferences, shut down and restart the server Macintosh, and monitor server activity.
- Server Manager lets you manage users, groups and their associated privileges using familiar AppleShare-like windows.
- Server Manager generates reports that can be used to answer configuration and performance-related questions.
- Server Manager can be scheduled to perform server-side actions automatically.



# AppleShare IP and the PC

Mac OS computers are friendly to other network citizens. While they are biased towards AppleTalk, they are willing and able to “speak” other protocols as well. In many organizations, for example, Mac OS computers communicate using strictly Novell’s IPX/SPX. They are also capable of speaking over many types of network topologies, including LocalTalk, Ethernet, Token Ring, Fiber Optics, Asynchronous Transfer Mode (ATM), and others. Overall, it is easy for Mac OS-based machines to fit in with other types of computers in a heterogeneous network environment.

Because Mac OS computers are so network friendly, their owners can take advantage of many services provided by other platforms. For example, some Mac OS users rely on the security of a Novell

NetWare file server for vital data storage. Others call on the processing power of a UNIX-based minicomputer or an IBM mainframe.

PCs have traditionally been more standoffish—until recently, PC vendors were reluctant to connect with the Mac OS. This has posed a problem for PC owners who want to share Mac OS-based services such as high-quality PostScript printing and AppleShare.

Fortunately, this problem is easy to overcome today. You can bring Mac OS computers and PCs together in two ways:

- **Use a multiprotocol server.** For example, a Novell NetWare server configured with the AppleTalk NetWare Loadable Module (NLM) can support PCs with IPX/SPX while simultaneously supporting Mac OS computers with AppleTalk and AFP. The Microsoft Windows NT Server can also support PCs and Mac OS computers simultaneously and provide AFP services. Although PCs and Mac OS machines may access these servers with different protocols, they are able to “see” and use many of the same server-based resources.
- **Use a common protocol.** A more direct way to bring Mac OS computers and PCs into the same fold is to configure them to speak the same network language. If your network is primarily composed of PCs, it makes sense to install a PC-native protocol such as IPX/SPX on your Mac OS computers. If your network is dominated by Mac OS computers, it makes sense to install AppleTalk on your PCs. If your network is connected to the Internet or an Intranet, the best approach may be to make your Mac OS computers and PCs speak the more universal TCP/IP.

In this chapter, I will show you how to install AppleTalk and TCP/IP to connect your PCs to your AppleShare IP server. I will also show you how to work with the platforms’ inherent differences. First, however, consider the similarities between the two platforms.

# COMPARING THE MACINTOSH AND THE PC

Much discussion has centered around differences between the Macintosh and the PC. Within the realm of networking it is more constructive to examine the qualities they have in common.

## Booting the PC

First, consider the startup sequence of your Mac OS computer:

1. When you press the power-on button, you hear a chime. The computer's ROM looks for a HFS-formatted hard drive. If a System file is available, you are greeted by the "Happy Mac."
2. A parade of INITs is displayed across the screen as these memory-resident applications are loaded into RAM.
3. Eventually, you end up in the Finder, looking at the desktop.

Although you may never have thought about it, PC operating systems work in much the same way. Consider how a DOS-based PC starts up:

1. When you press the power-on button, you hear a beep. You watch the ROM BIOS (Basic Input Output System) in action as it counts RAM in the corner of the screen. If the RAM is functioning properly, the ROM will look to the hard drive for the invisible files IO.SYS and MS-DOS.SYS for additional instructions. At this point, we are at the PC equivalent of the "Happy Mac."
2. The computer looks for COMMAND.COM, the *command line interpreter*, next. This vital application tells the processor what you mean when you type on the keyboard. If the COMMAND.COM file is missing, the PC will not boot. In the Mac OS, if the System file is missing, the Macintosh will not boot.

3. The PC will load two files, CONFIG.SYS and AUTOEXEC.BAT. These files contain user-programmable instructions that determine how the computer should handle memory and peripheral devices. These files also contain instructions for loading Terminate and Stay Resident (TSR) programs. TSRs are the PC equivalents of Mac OS INITs.
4. Eventually you find yourself in the root directory, looking at the prompt:

C:\

Under DOS, the letter **C:** usually designates the first hard disk in the PC. Many PCs also have two floppy drives. The first is for 1.44-Mbyte 3.5-inch floppy diskettes and is labeled **A:**. The second is for 1.2-Mbyte 5.25-inch floppy diskettes and is labeled **B:**. A CD-ROM, DAT, or Iomega drive (Zip, Jaz), will usually get a **D:**.

5. The boot process continues if the PC is loaded with Microsoft Windows. In this case, it will keep going beyond the **C:** prompt and load the Windows environment. Under Windows 3.1, this environment is no more than a GUI shell. Under Windows 95 and Windows NT, however, it is a full operating system that compares favorably to the Mac OS.

## Networking the PC

Next, consider how your Mac OS computer is connected to the network. It may be attached through an onboard connector, such as a LocalTalk, Ethernet, or AAUI port, or it may be connected via an expansion card.

There are only three expansion buses to choose from on the Macintosh. Older Mac OS computers used NuBus. Newer ones use the Peripheral Component Interconnect (PCI) bus. PowerBooks may use the PC Card bus. Because the Macintosh adheres to just these standards and truly supports “plug-and-play,” all you need to know to get the right NIC is which bus your computer has.

## PC Standards

Things can be more complicated on the PC. Depending upon the bus configuration of the PC, the NIC you buy will need to adhere to one of several PC standards, as explained in the following paragraphs.

**32-bit, 16-bit, or 8-bit.** These numbers refer to the size of the pathway over which data moves to and from a computer's RAM and its I/O devices. The newest PCs have 32-bit expansion buses. Many older PCs have several 16-bit expansion slots and a couple of 8-bit expansion slots for downward compatibility. Really old (early 1980s) PCs have only 8-bit buses.

**ISA.** The Industry Standard Architecture (ISA) bus, pronounced "eye-suh," was first used in IBM's AT of 1984. ISA expansion boards will also work in an EISA (Extended ISA—pronounced "e-suh") bus. This standard brought the ISA bus up from 16 to 32 bits in 1988.

**MCA.** The 32-bit Micro Channel Architecture (MCA) bus is used mostly in IBM computers, such as the PS/2. It is far less common than the ISA bus.

**PCI.** The Peripheral Component Interconnect (PCI) bus came out in 1993. It gives PCs a "plug-and-play" capability similar to that of the Macintosh. (Some deride this as "plug-and-pray.") PCI supports both 32- and 64-bit buses.

**PC card.** The PC Card is a trademark of the Personal Computer Memory Card International Association (PCMCIA). It supports the credit card-sized peripherals that are used primarily with laptops.

In addition to these hardware standards, there are some hardware driver standards you will need to learn about as well:

**ODI.** The Open Data-link Interface (ODI) driver standard was created by Novell to permit a PC NIC to run multiple protocols simultaneously.

**NDIS.** Conceptually similar to ODI, NDIS was co-developed by Microsoft and 3Com. It provides protocol multiplexing, which allows multiple protocol stacks to co-exist on the same NIC.

## **PC Software**

Before you purchase or attempt to install AppleTalk on a PC, you will need to know what hardware is present and which standards are supported by that hardware.

Apple Workgroup Servers are bundled with software that permits PCs running Windows 3.1 or Windows 95 to communicate using AppleTalk. Windows NT machines are sold with an AppleTalk protocol stack from Microsoft. DOS PCs require another product, such as Farallon's PhoneNET PC.

Let's take a look at the issues that affect Mac OS-to-PC integration, beginning with the lowliest AppleShare client: DOS.

# **APPLETALK UNDER DOS**

In order to install and use AppleTalk on a DOS-based PC, you need to know some basic DOS principles.

## **Working with Directories**

DOS-based PCs arrange their files in directories and subdirectories; Mac OS computers arrange their files in folders and subfolders. Other than that, both machines store files in much the same way.

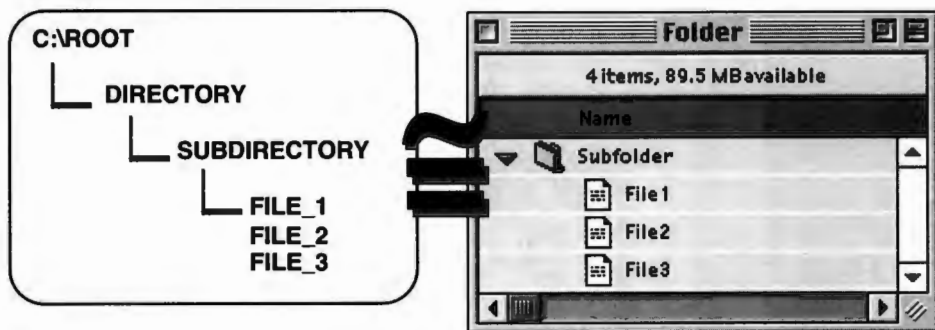


FIGURE 10-1: DOS versus Mac OS hierarchies.

To open a DOS directory, type **CD** (for “change directory”) and the directory’s name at the **C:** prompt; then press **Enter**. For example, typing the command below will get you inside the DOS directory from the root (top-most) directory:

```
C:\cd dos
```

To see the system files that the directory contains, type **dir** (for “directory”) and you will get an alphabetical listing:

```
C:\dir
```

To back out of this directory and go back to the root directory, one level above it in the hierarchy, type the command below:

```
C:\cd ..
```

## Naming Conventions

In addition to being accessed differently, DOS directories use naming conventions different from those of Mac OS folders. The Mac OS supports folder and file names 31 characters long. DOS machines support file names only 12 characters long, in the following format: eight characters, a period, and a three-character extension. This is known as the “eight-dot-three” (8.3) convention.



Because of these different naming conventions, a folder that has one name on the Mac OS might be named differently on the PC. For instance, the folder you named “Approved Applications” on the server is **Approv~1** as seen by DOS when accessed using AFP.

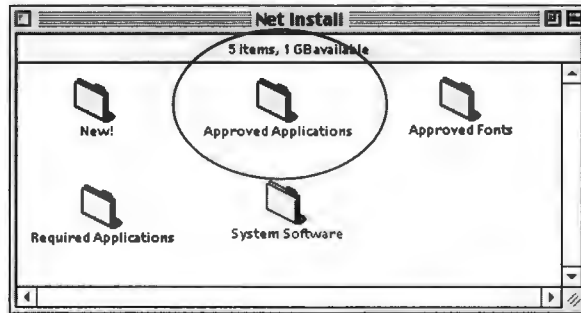


FIGURE 10–2: The folder “Approved Applications” as seen by a Mac OS user.



FIGURE 10–3: The folder “Approved Applications” as seen by a DOS user.

Windows 95 and NT are capable of using a larger name space, but they do not always recognize all of the characters that the Mac OS uses. For example, I added a space before the name of the “New!” folder so that it was listed at the top of the “Net Install” folder while being viewed with the Mac OS’ **List** command. Windows 95 does not know what to make of the space, so it calls the folder “New!~1.”

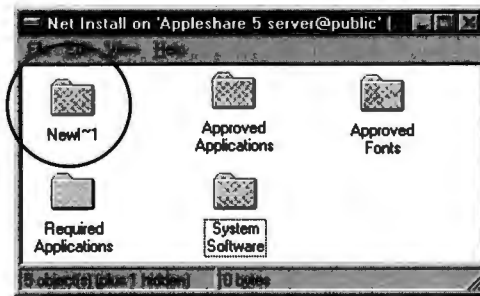


FIGURE 10-4: The folder “New!” as seen by a Windows 95 user.

## Short Names

Before you allow PCs to log on to AppleShare, you should name the server’s folders and files in a way that will make sense to users on all platforms. For example, a “Human Resources” folder could be renamed “HR”; an “Applications” folder would still be recognized if renamed “Apps.”

To make the job easier, AppleShare IP has a feature that tells you what your folder names will look like from the perspective of a PC user. To use it, select a folder in Web & File Server Admin’s Disks & Share Points window, and then choose the **Short Name** command from the **Server** menu bar item.

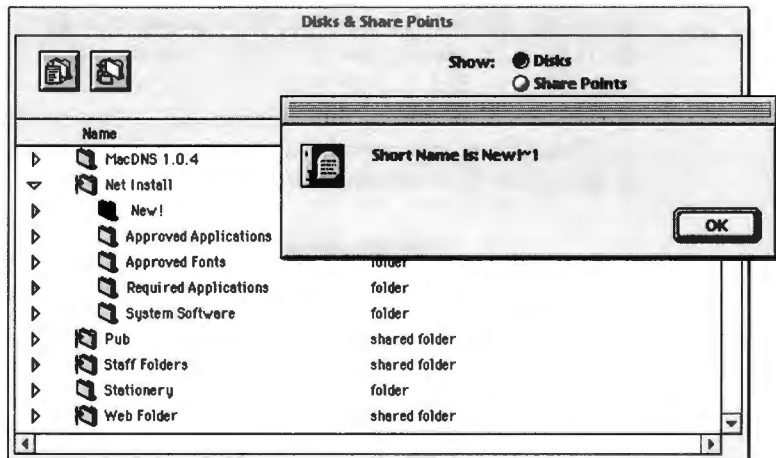


FIGURE 10-5: Viewing the short name of a folder.

## Working with DOS Files

In addition to handling folder and files names differently, Mac OS computers and PCs handle files differently.

A Macintosh file is composed of two parts: a *resource fork* and a *data fork*. The data fork contains the core text or programming code. The resource fork contains the more esoteric data, such as formatting information, the icon, and the file's *creator code*. Creator codes are unique identifiers that tell the Mac OS which file goes with which application. For example, if a user-generated document has the creator code MSWD in its resource fork, the Mac OS knows that it was created with and can be opened by Microsoft Word.

DOS files use only data forks. To perform the same file-to-application association that the Mac OS uses inherently, DOS users rely on a file name's three-letter extension. This is called *suffix mapping*. For example, if a user-generated document's file name has the extension .FMP, some DOS applications will know that it was created with, and can be opened

by, Claris FileMaker Pro. Unfortunately, this system is not reliable. Apple Computer provides creator codes to developers to keep these codes unique. Such standardization was never forced on PC vendors, however, so suffix mapping has its limitations.

In order for Mac OS and DOS users to share files, a mechanism must be in place that maps the creator code from the Mac OS to the three-letter extension of the PC file, then strips away the resource fork. Conversely, Mac OS users must have a resource fork created for them and the three-letter DOS extension associated with a Mac OS creator code.

On the Mac OS, this is done transparently by the PC Exchange and Macintosh Easy Open control panels. Third-party translation software, such as MacLink Plus from DataViz, Inc., can enhance the process.

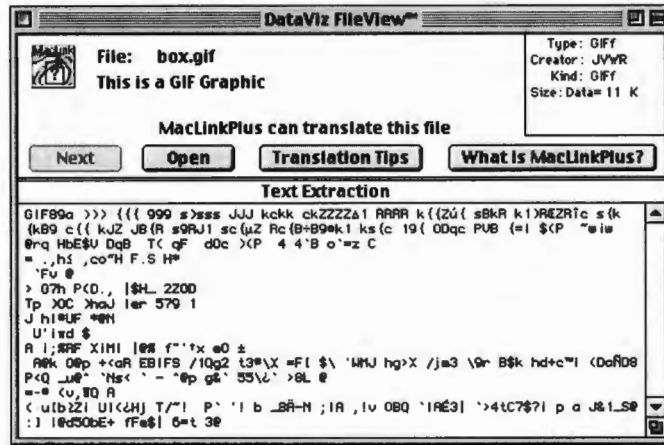


FIGURE 10-6: Viewing a file's data with MacLink Plus.

If you know that users will copy files back and forth between DOS and the Mac OS regularly, you will want to take several steps to keep the process moving smoothly.

First, make sure that the Mac OS computers are running the PC Exchange control panel.

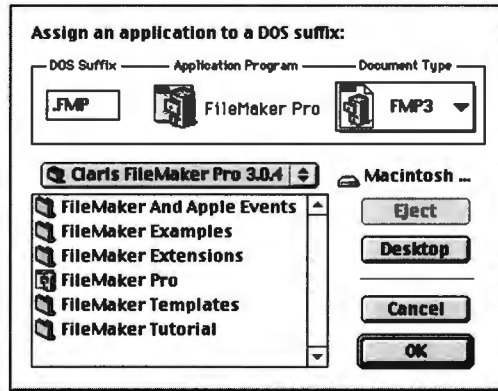


FIGURE 10-7: Configuring PC Exchange for suffix mapping.

In addition to automatic Mac OS-to-DOS file recognition, this control panel can also create associations manually. For instance, you could use it to map a word processor file, such as one created by WordPerfect for DOS (.DOC), to a Mac OS word processor, such as Microsoft Word. This way, both users will be able to work with the files in their preferred application.

Next, make sure that PC users employ file name extensions properly. Some applications, such as FileMaker, will add an extension (.FMP) automatically. Tell your users to add an agreed-upon suffix when using applications that do not add extensions automatically.

Next, try to ensure that both Mac OS computers and PCs are using applications intended to be cross-platform (e.g., Microsoft Office, Claris FileMaker Pro, etc.). Also, make sure that users employ the filters that have been built into their applications when they are saving files to be used on different platforms. These can be accessed through the **Save as** function.

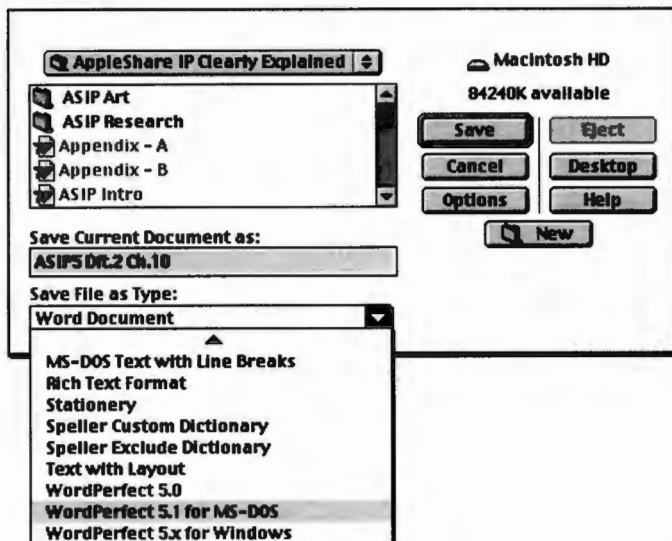


FIGURE 10-8: Using a built-in filter (Microsoft Word).

Where there is no other option, documents can be saved as **ASCII** or **Text Only**. This will not preserve formatting, however.

Finally, arrange your server share points in such a way that Mac OS users may access PC documents but not PC applications. Do the same for PC users. If you do not, users may try to launch non-native applications that might then be corrupted.

It is also a good idea to create share points for PC-native files only and Mac OS-native files only, as well as to create share points accessible by both platforms. Users should save their vital documents to their respective platform-native volumes first, then translate copies to be shared with cross-platform users. That way, master documents will be preserved in the event that a translation attempt corrupts a file.

## Installing DOS Software

DOS installation disks come with installer batch files that work much like the Apple installer script. Most of the time, the installer will be called **INSTALL.EXE** or **SETUP.EXE**.

The installer will usually present you with a few screens that prompt you for information about the PC's hardware configuration. It will make a guess at a default, but that guess might be a poor approximation of what the PC really has inside. If you are not sure of the exact configuration, it is best to write down the prompted questions and then exit the installer to seek out the answers.

Most installers will ask if you want them to modify your **CONFIG.SYS** and/or **AUTOEXEC.BAT** files in order to include certain command variables. Back up these files first in case the new installation causes your machine to crash. To do this:

1. Put a fresh floppy diskette in the PC.
2. Format the diskette as a "system disk." This installs on it several boot files, making it capable of running the PC should something happen to the system files on the hard drive. Type:

```
\format A: /s
```

You will be prompted for the diskette first, then asked for a diskette name later. Just press **Enter** at both prompts. When asked whether or not you would like to format another diskette, press **N**.

3. Copy the **AUTOEXEC.BAT** file onto the floppy diskette by typing:

```
\copy C:\autoexec.bat A:
```

4. Copy the **CONFIG.SYS** file onto the floppy diskette by typing:

```
\copy C:\config.sys A:
```

In both cases, DOS will let you know if you did this correctly with the message:

```
1 file(s) copied
```

With these files backed up, it is safe to run the installer. Should a problem arise, you can boot up from the floppy disk and copy the **AUTOEXEC.BAT** and **CONFIG.SYS** files back over to the hard disk, restoring the PC to its previous condition.

## MOVING FILES IN DOS

DOS-only PC users may use Farallon's PhoneNET PC to attach server volumes. These volumes are mapped to a DOS drive letter (e.g., **D:**, **E:**, etc.). Users may transfer files back and forth using the same DOS commands as those used to access a local hard disk.

Windows users who need to access a DOS program may log on to the server using AppleShare Client for Windows or COPS, Inc.'s COPSTalk. They may then issue commands using a DOS session activated through Windows' DOS Prompt application.

To copy a DOS file from a local drive to a network drive, use a command line such as:

```
\copy C:\example.bat E:
```

If done correctly, the PC responds with:

```
1 file(s) copied
```

If the file is not found in the root directory, add the path to its subdirectory in the same command line:

```
\copy C:\windows\system\system.ini E:
```

At some point you might type a long line that contains a mistake. You will then be told **File(s) not found**. Rather than retype the entire command line, press **F3**. This will restore everything you typed up to the point of pressing **Enter**. You can then use the backspace key to correct your mistake.



If a file is important, it is a good idea to make a duplicate of it. To do this, copy and rename it using a command line such as:

```
\copy C:\config.sys C:\config.bak
```

To copy all files with a given extension, use a command line such as:

```
\copy C:\*.bat E:
```

To copy all files with a given name, use a command line such as:

```
\copy C:\example.* E:
```

To copy all files in a directory, use a command line such as:

```
\copy C:\*.* E:
```

To delete a file, use a command line such as:

```
\erase example.bat
```

To create a directory, use a command line such as:

```
\mkdir work
```

The same DOS 8.3 naming convention that applies to files applies here as well. Also, names must start with either a letter or a number. Names may not include the characters / [ ] ; = “ \ : | , or a comma or period.

To remove a directory, use a command line such as:

```
\rmdir work
```

DOS displays the following directory and file information by default:

- Size of files (in Bytes)
- Last Modification Date of files
- Last Modification Time of files
- Number of Files and Directories
- Hard drive space used by Files and Directories

To see these file and directory details, type **DIR** at the command prompt:

```
E:\DIR
```

You will see something similar to this:

```
Volume in drive E is SERVER
Volume Serial Number is 1AB1-7857
Directory of E:\

EXAMPLE BAT20712-25-943:02p
WORK<DIR>12-25-943:05p
HR<DIR>11-11-932:06p
.
    3 file(s)48234 bytes
    514333568 bytes free
```

If more files exist than can be seen all at once, type **DIR/P**. This directs DOS to fill the screen and then pause, until you press a key, before continuing.

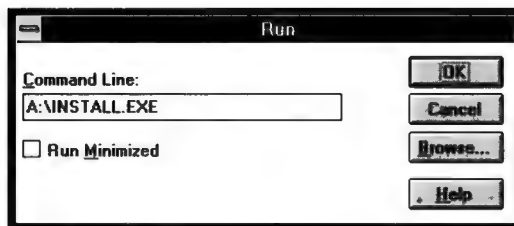
## APPLETALK UNDER WINDOWS 3.1

AppleShare IP ships with the AppleShare Client for Windows, which can be run under Windows 3.1. It provides a simple interface that permits Windows users to print to networked Apple LaserWriters and map AppleShare server volumes to drive letters. Users can use AFP to copy files to and from these volumes within Windows's File Manager.

A PC cannot act as an AFP server and make its files available in the same way that a Mac OS computer can using Personal File Sharing. But it can use AppleTalk's distributed name service and dynamic node ID assignment.

## Installing AppleShare Client for Windows

To install this software, select **Run** from the Windows **File** menu. In the dialog box that appears, use the **Browse** button to locate the installer.



---

FIGURE 10–9: Launching the installer through Windows 3.1.

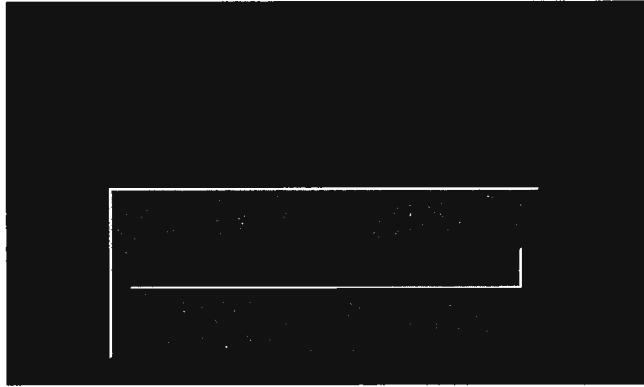
Choose the **Standard Installation** button in the installer's main screen; then press the **Continue** button.



---

FIGURE 10–10: Selecting options in the installer's main screen.

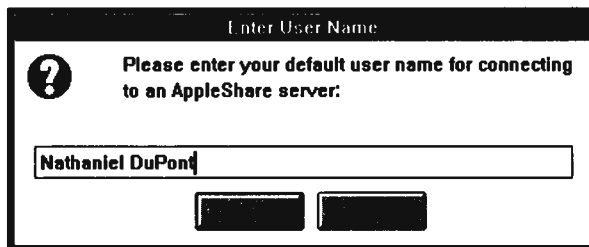
Apple's installer makes a backup of system files before changing them. It then asks about the PC's NIC configuration before installing the client software.



---

FIGURE 10-11: Viewing the installer's progress.

The installer will eventually ask you to enter a user name and a machine name. These are the Windows equivalents of the Mac OS File Sharing control panel owner name and computer name. Enter the requested information and press the **Continue** button.



---

FIGURE 10-12: Entering the PC user name.

## Using AppleShare Client for Windows

The installer creates a Program Group, which contains four icons. AppleShare Client for Windows is the only application that you need to launch. Its functions can be accessed using the three buttons in the upper left of the application's main window.

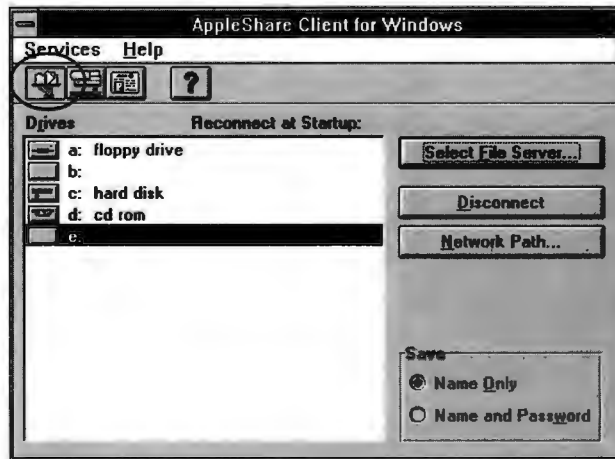


---

FIGURE 10-13: Viewing the AppleShare Client program group.



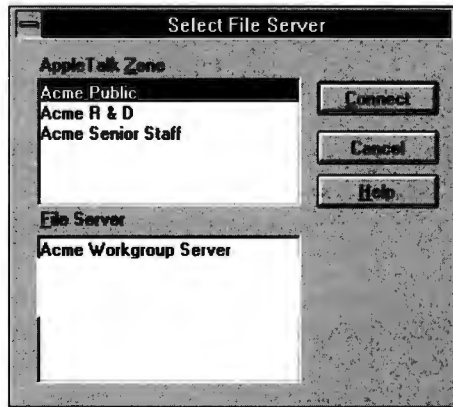
### Select AFP File Servers



---

FIGURE 10-14: Selecting a drive letter for the server volume.

To log on to an AppleShare server, press the first button in the upper left. A list of local volumes and available network drive letters appears. Here, select a drive letter to map to an AppleShare network volume. You will then be presented with a Chooser-like list of zones and the servers within those zones. Choose the AppleShare server; then press the **Connect** button.



---

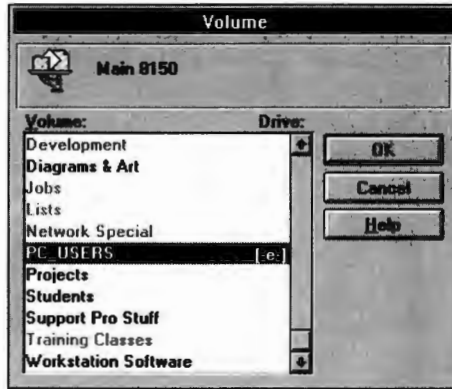
FIGURE 10-15: Selecting a server's zone and name.

An AppleShare log-on dialog box will appear. As you would under the Mac OS, enter your user name and password, and then press the **OK** button.



---

FIGURE 10-16: Logging on to the server.



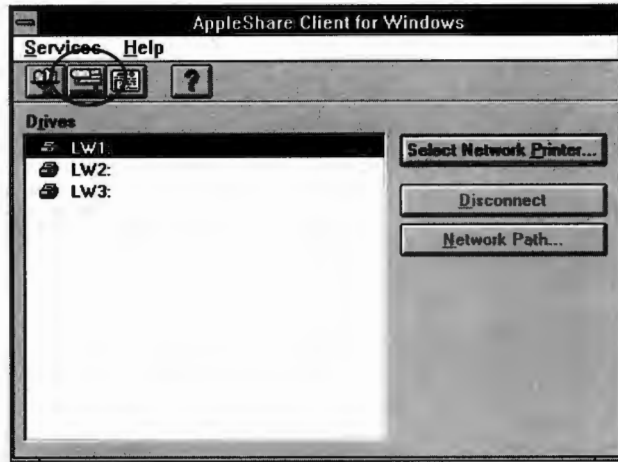
---

FIGURE 10-17: Choosing server volumes.

Next, you will be presented with the list of server volumes that you may attach. Pick the volume that you want to work with; then press the **OK** button. That volume is now “attached” to your PC and can be accessed like a local hard disk.

## Select LaserWriter

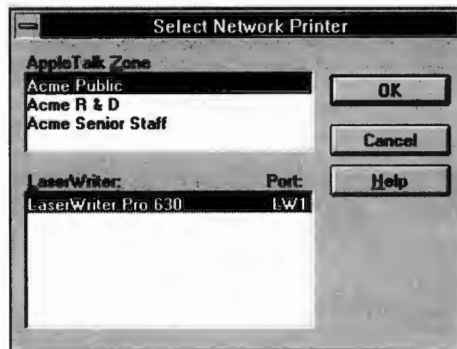
To print to a LaserWriter, press the second button in the upper left. You will be shown a list of ports to which you can “connect” the device. In the same way that the Mac OS uses a Modem and a Printer port, the PC uses an “lpt” port, named in the days of “line printers.” Choose a port that is not in use, then click **Select Network Printer**.



---

FIGURE 10-18: Attaching a LaserWriter.

In the next window that appears, choose the LaserWriter's name and AppleTalk zone.



---

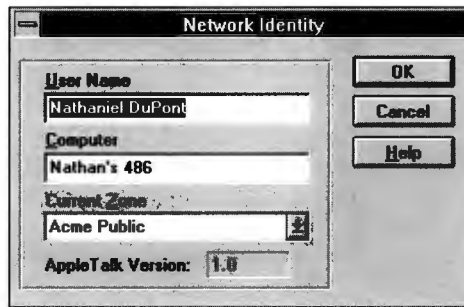
FIGURE 10-19: Selecting a printer name and zone.

Press the **OK** button when you have finished. You will be warned that the necessary printer drivers must also be installed to allow you to print to the LaserWriter from any Windows applications. Depending upon the printer, these drivers will be found in one of two places: on the Windows installer diskettes or on Apple diskettes that came with the LaserWriter.



## Set the User and Machine Names

You can change the PC's user and machine name at any time by pressing the third button in the upper left. This opens a window that can be regarded as the equivalent of the Macintosh Sharing Setup control panel. You can also change the machine's default zone here.



---

FIGURE 10-20: Changing user and machine names.

## Moving Files in Windows 3.1

Windows' File Manager can work with files and folders on attached AFP volumes. To see a graphical representation of the hard drive's contents, you can launch File Manager from its Windows program item in the Main program group. Instead of directories, you will see folders, files represented by earmarked pages, and programs represented by small windows.

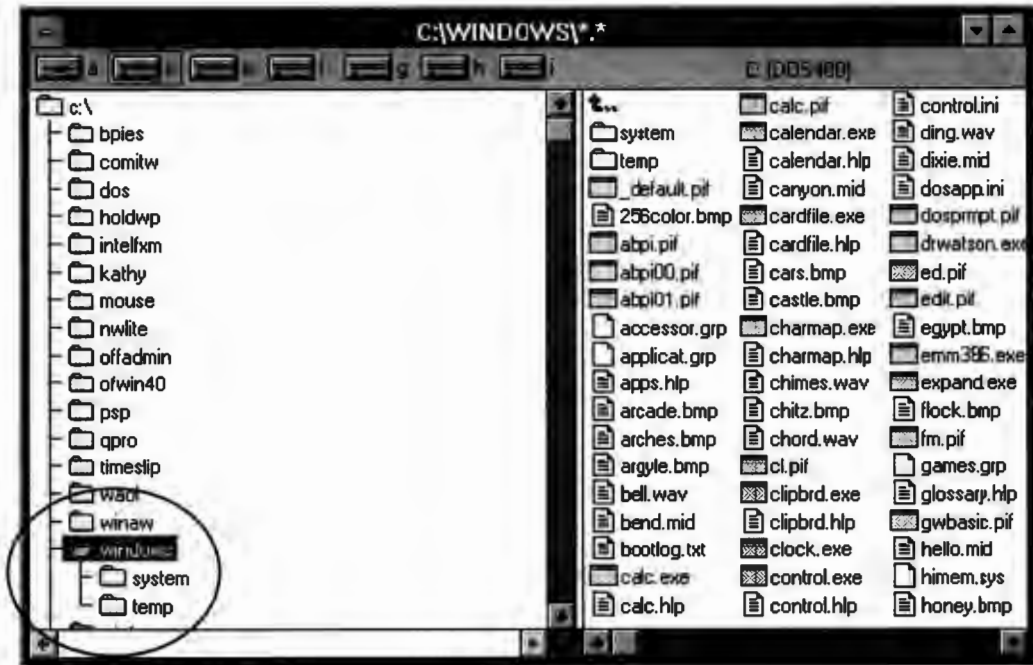


FIGURE 10-21: Working with File Manager.

Note the open folder in Figure 10-21. File Manager defaults to the Windows directory. The files on the right are Microsoft Windows 3.1 programming files. If you were to exit Windows and go back into DOS at this point, you would find `C:\WINDOWS` at the `C:` prompt. To get to the root directory, you need to double-click the `C:\` folder icon.

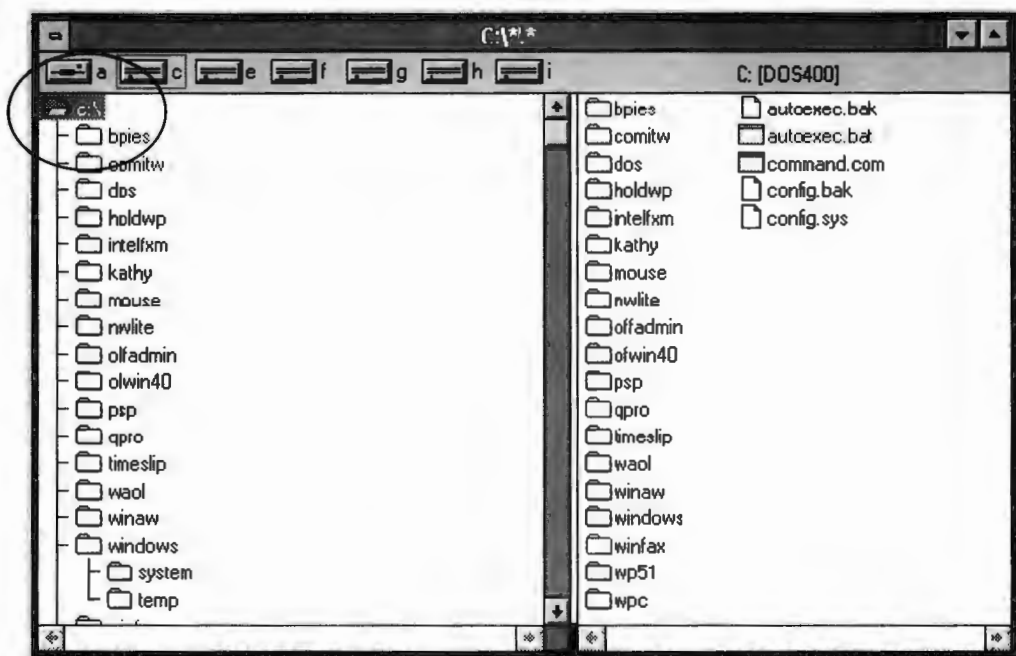


FIGURE 10-22: Directing File Manager to the root directory.

To access a network volume, click on its namesake button at the top of the File Manager window.

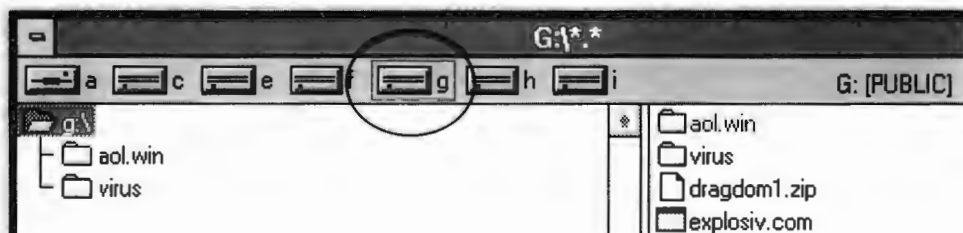


FIGURE 10-23: Accessing a network volume.

To copy a file from the server, select it and drag it over to the C volume icon. Whichever directory was open when you left the C volume is where the network volume's file will be copied. In this example (Figure 10-23), we left the root directory open. Had we not taken the earlier step (Figure 10-22), it would have been copied to the C:\WINDOWS directory.

You can copy groups of files and folders by holding down the **Shift** key, using the mouse to select blocks of consecutive files. To select files that are not listed consecutively, hold down the **Control** key instead.

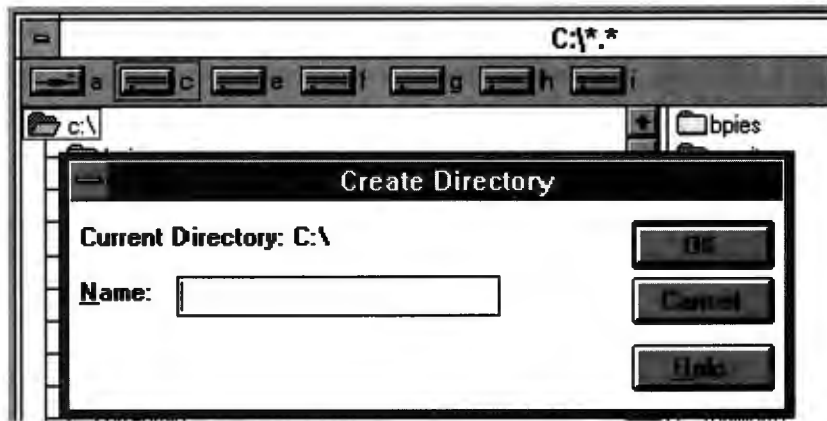


FIGURE 10-24: Creating a folder (directory).

To make a new folder, choose the **Create Directory** command from the **File** menu. As when copying files, your current location in File Manager's directory tree is where the new folder will be created. The 8.3 DOS naming convention applies here also.

To rename a folder, choose the **Rename Directory** command from the **File** menu.

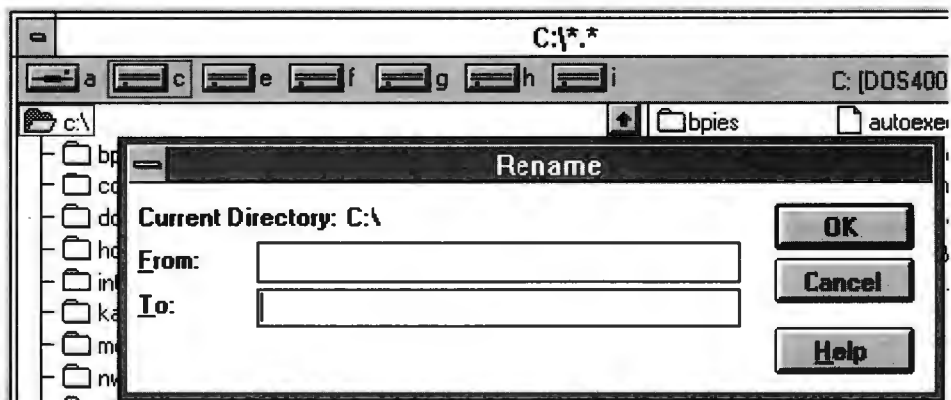


FIGURE 10–25: Renaming a directory.

Although the default File Manager window gives you few details about directories and files, you can see more. File Manager can list and sort files and directories by:

- Size (in Bytes)
- Last Modification Date
- Last Modification Time
- File Attributes (such as hidden, system, archive, etc.)

To see these file and directory details, select the **All File Details** command from the **View** menu.

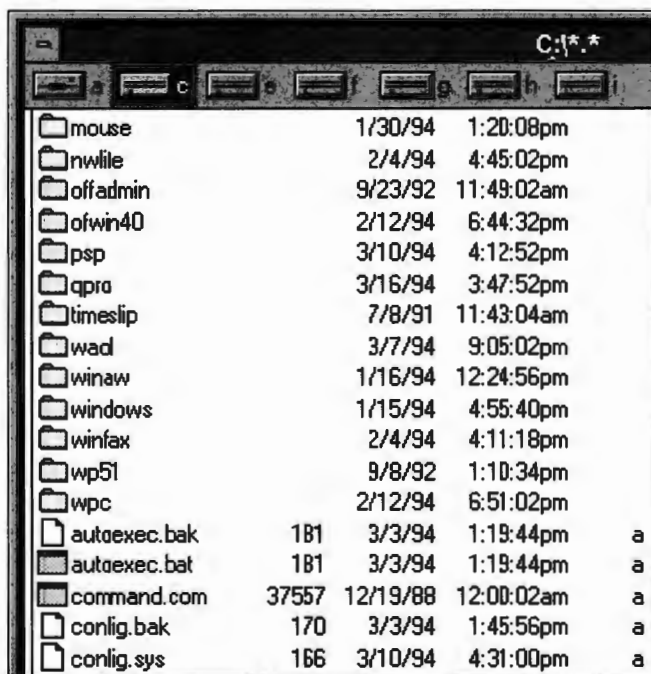


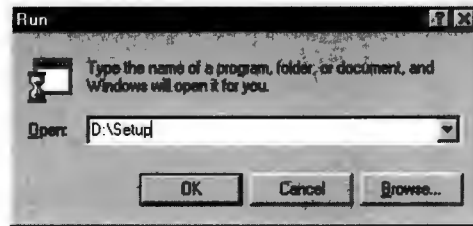
FIGURE 10-26: Viewing file details in file manager.

## APPLETALK UNDER WINDOWS 95 AND NT

Windows NT comes with its own AppleTalk protocol stack, at last making the PCs that use it as friendly to Mac OS computers as they are to each other. Windows 95 does not include this capability. AppleShare IP is bundled with the CoOperative Printing Solutions (COPS), Inc.'s COPSTalk, however, which installs and works in much the same way as the Windows NT protocol stack. Both Windows NT and COPSTalk enable PC users to print to networked Apple LaserWriters and map AppleShare volumes to drive letters.

## Installing COPSTalk

To install COPSTalk, select **Run** from the Windows **Start** menu. Here, use the **Browse** button to locate the installer.



---

FIGURE 10-27: Launching installer through Windows 95.

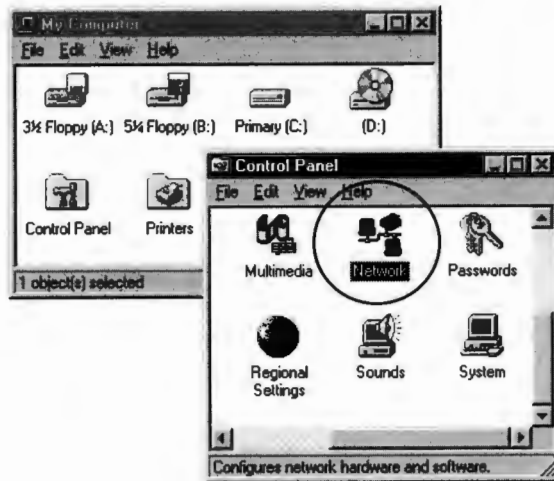
COPSTalk is installed using a handy Windows “wizard.” Simply answer the questions as they are posed.



---

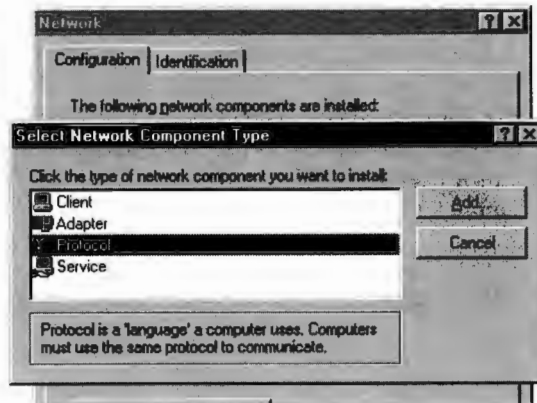
FIGURE 10-28: Using the COPSTalk installer.

Before proceeding, make sure that there are no remnants of other AppleTalk protocol stacks on the PC, such as PhoneNET PC or AppleShare Client for Windows.



---

FIGURE 10-29: Locating the Network control panel.



---

FIGURE 10-30: Adding a protocol.



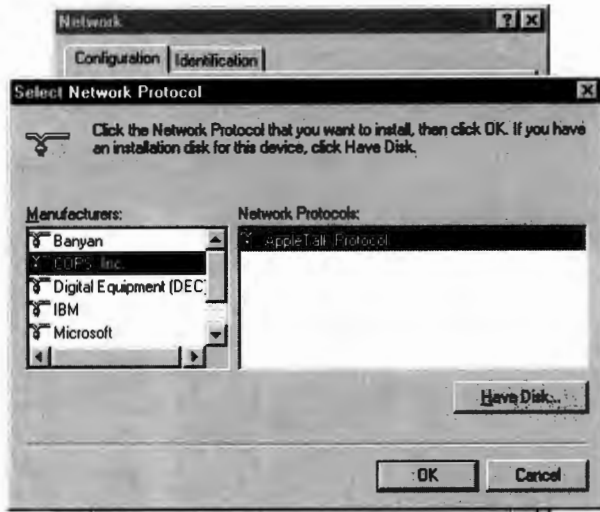
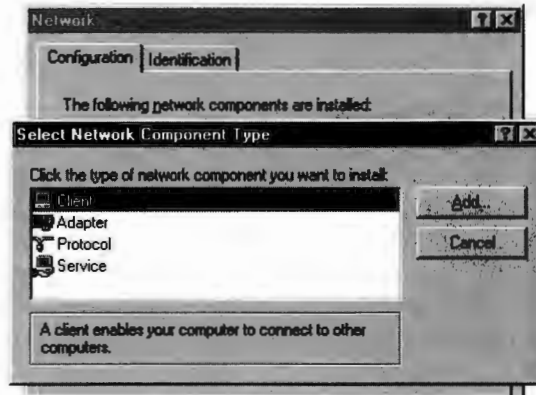


FIGURE 10-31: Selecting the protocol.

When the installer has finished, you will be prompted to restart the PC. Once you have done so, you must load the AppleTalk protocol stack so that Windows can use it. To do this, open the Network control panel, which is located in the Control Panel folder in the My Computer window. You will see two tabs. Under the **Configuration** tab, press the **Add** button. This will open a window in which you can choose network components. Then select **Protocol** and press the **Add** button. This will open a window in which numerous vendors and network protocols are listed. Select “COPS, Inc.” in the **Manufacturer** pane and “AppleTalk Protocol” in the **Network Protocol** pane. Press the **OK** button when you have finished.

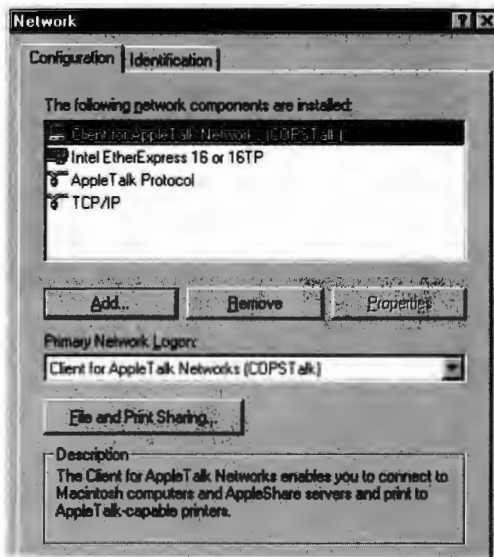
When you return to the Select Network Component Type window, select **Client** from the list and press the **Add** button again.



---

FIGURE 10–32: Adding a client.

You will again want “COPS, Inc.” in the **Manufacture** pane. Select “Client for AppleTalk networks (COPSTalk)” in the **Network Clients** pane. Press the **OK** button to return to the control panel window. Press the **OK** button to exit the control panel. Then restart the machine.



---

FIGURE 10–33: Control panel with AppleTalk added.

This is the same procedure used to install AppleTalk under Windows NT.

## Using COPSTalk

The installer creates a COPSTalk Program Group. You do not need to use anything here. Once AppleTalk has been installed, you can access AppleShare services in the same way that you would any PC-native networking services. This is generally done using the desktop's Network Neighborhood window, a browser that performs much like the Mac OS Chooser.

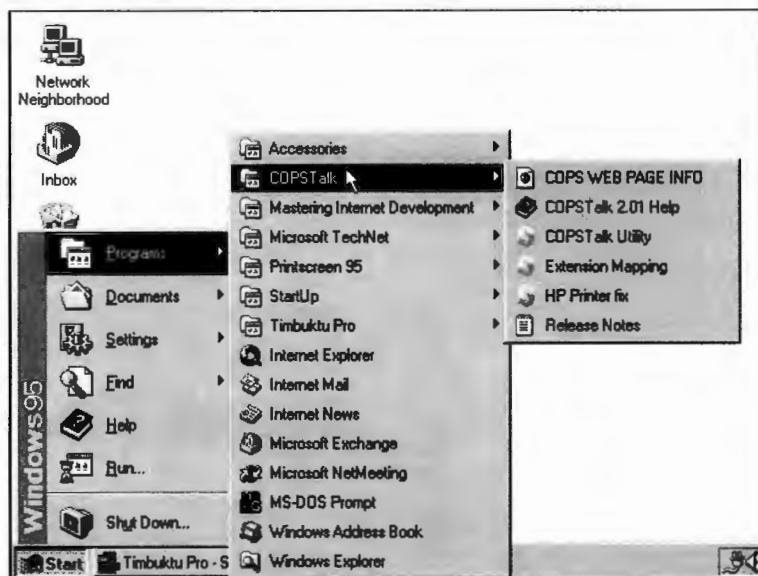


FIGURE 10-34: Viewing the COPSTalk program group.

## Select AFP File Servers

To log on to an AppleShare server, you will need to navigate through progressive Network Neighborhood windows until you find its AppleTalk zone and name.

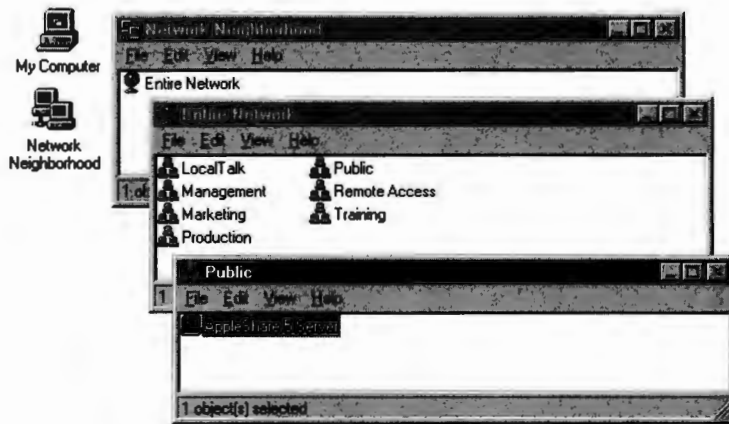


FIGURE 10-35: Locating the AppleShare IP server.

Double-click on the server icon to open an AppleShare log-on dialog box. Here, enter your user name and password and press the **OK** button. You will then be shown the list of available AppleShare volumes.

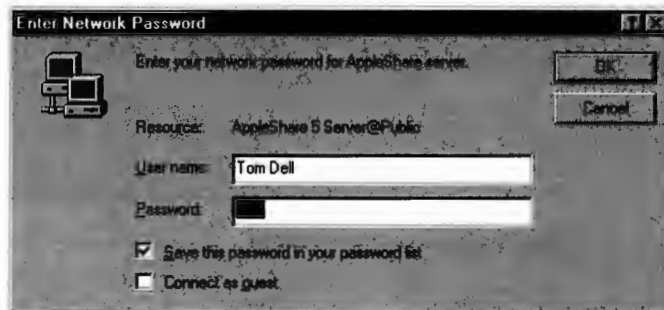
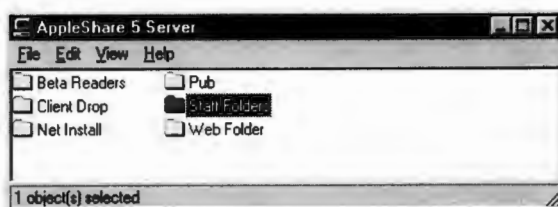
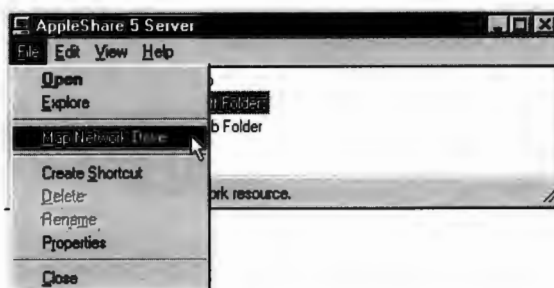


FIGURE 10-36: Logging on to the AppleShare IP server.



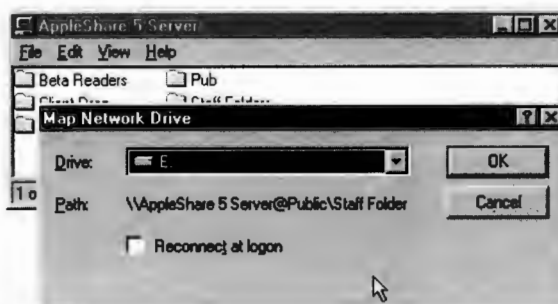
---

FIGURE 10-37: Selecting a server volume.



---

FIGURE 10-38: Mapping a server volume to a drive letter.



---

FIGURE 10-39: Choosing the network drive letter.

Select the volume that you wish to attach; then select the **Map Network Drive** command from the **File** menu in the server volume's window. You

will be prompted to choose a drive letter. The AppleShare volume then becomes accessible through the My Computer window, just like any local volume.

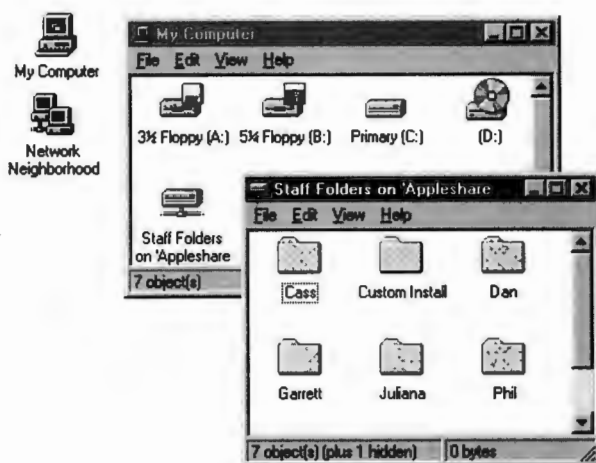


FIGURE 10-40: Viewing the network volume from the My Computer window.

## Select LaserWriter

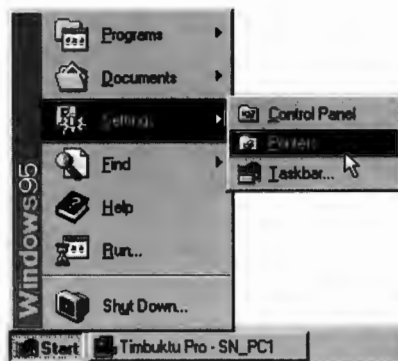


FIGURE 10-41: Opening the Printers window.

To print to a LaserWriter or AppleShare IP print queue, you will first need to add it to your PC's available printer group. To do this, choose the **Printers** item under the **Settings** command in the **Start** menu to open a Printers window—any local printers will have an icon here. To create one for a networked LaserWriter, double-click on the Add Printer icon.

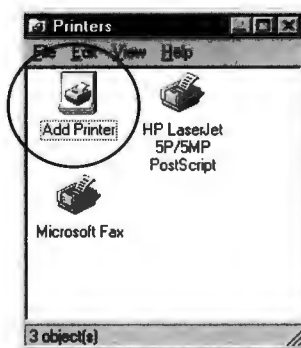


FIGURE 10-42: Adding a LaserWriter.



FIGURE 10-43: Running the Add Printer wizard.

This will launch another Windows' wizard, which will ask you if the printer is local or on the network, and then let you install a driver for it. Since the LaserWriter or print queue is on the network, you will have to show the wizard where.



FIGURE 10-44: Locating a network printer or print queue.

Once you have installed a driver and completed the other steps required by the wizard, a new icon will be created in the Printers window for the LaserWriter. This icon acts much like any Mac OS desktop printer icon. Double-click on it to view and control print jobs.

To make the network printer your PC's default, choose the Set As Default option under the Printer icon's Printer menu.



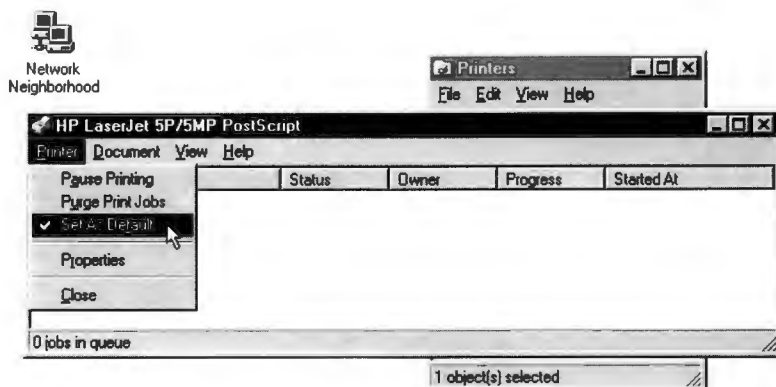


FIGURE 10-45: Setting a printer as the Default.

## Set the User and Machine Names

You can change the PC's user and machine name any time by opening the Network control panel and pressing the **Identification** tab. Here you may change what is currently in the **Computer name** and **Computer Description** fields.

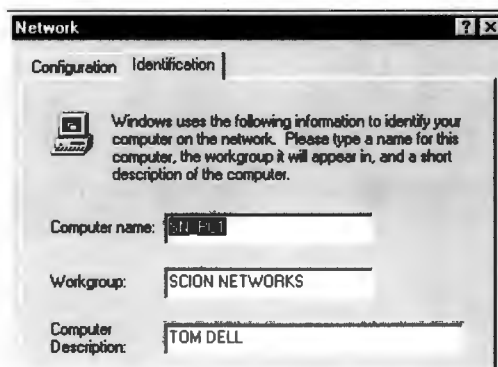
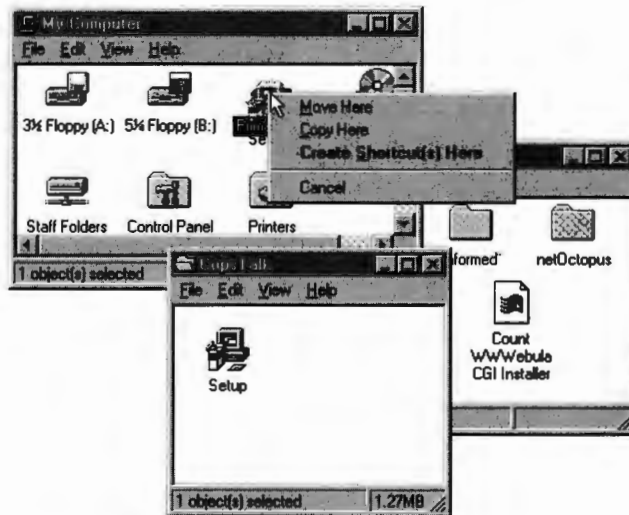


FIGURE 10-46: Changing user and machine names.

## Moving Files in Windows 95 and NT

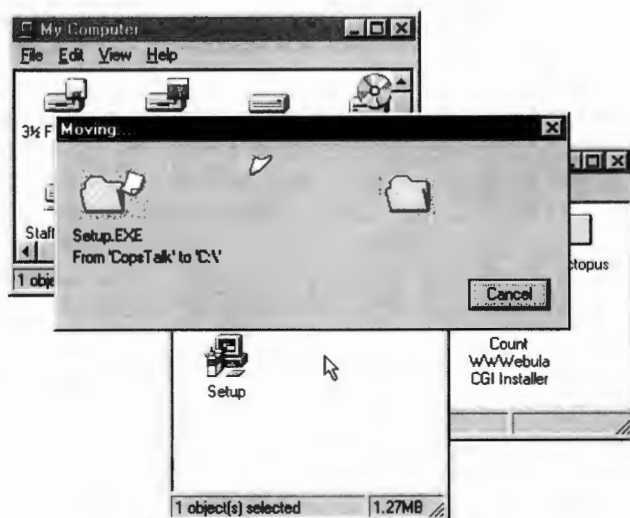
Unlike Windows 3.1, Windows 95 and NT use the same drag-and-drop methodology of the Mac OS. You are presented with additional options when you use the PC mouse's second button. If you drag a file from a network volume using the **Move Here** command generated by that second button, it will put the file in your local hard drive and then remove it from the server. If you drag a file from a network volume using the **Copy Here** command, it will put a duplicate of it in your local hard drive. If you drag a file from a network volume using the **Create Shortcuts** command, it will leave the file where it is and create a Mac OS alias-like pointer on your local hard disk.



---

FIGURE 10-47: Dragging and dropping a network file.

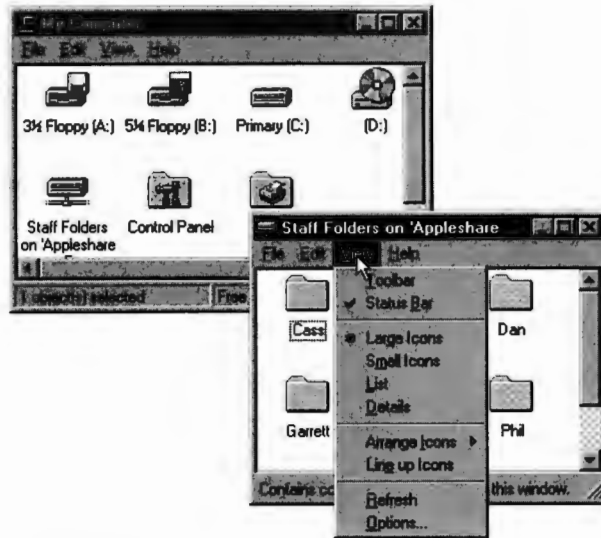
When you copy a file from the server, you will see a Windows version of the File Transfer status window.



---

FIGURE 10-48: Copying a file from the server to a local hard disk.

The folder and file details that can be viewed under Windows 95 and NT are more Mac OS-like as well. These can be accessed under a window's **View** menu.

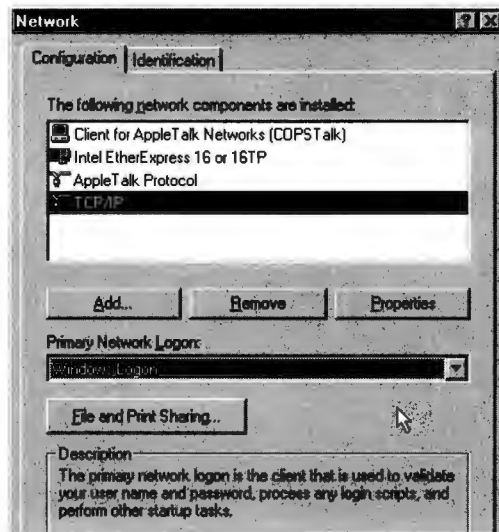


---

FIGURE 10-49: Changing the window view.

## TCP/IP AND RELATED SERVICES

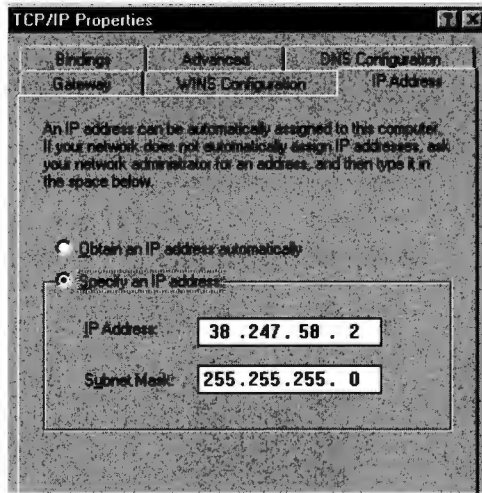
It is possible to run TCP/IP on DOS and Windows 3.1 machines, but not usually worth the effort. Windows 95 and NT are shipped with TCP/IP, however. To use it, you need to install the protocol in the same way that I described the installation of COPSTalk.



---

FIGURE 10–50: Installing the TCP/IP protocol.

Configure the protocol by pressing the **Properties** button in the Network control panel. Although the fields vary somewhat between Windows 95 and NT, and even more from those of Open Transport, the information required is the same.



---

FIGURE 10-51: Configuring TCP/IP control panel properties.

With TCP/IP installed, your PC users have access to further AppleShare IP and related services.

## Web Services

Web browsers were made to be platform independent, so the versions of Netscape Navigator or Microsoft Internet Explorer that your Mac OS users surf with look mostly the same as those used by their PC counterparts. They also provide access to the AppleShare IP-based Web page or Intranet.

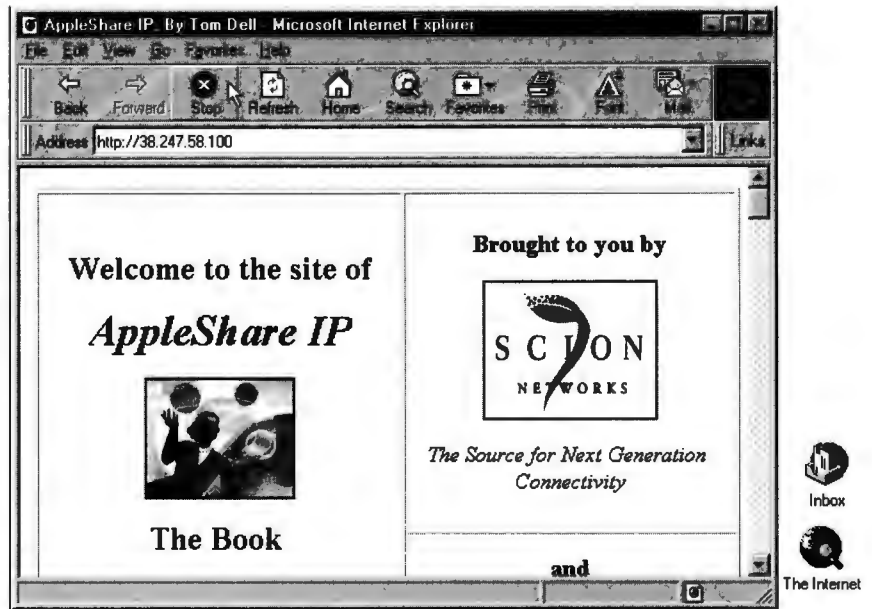
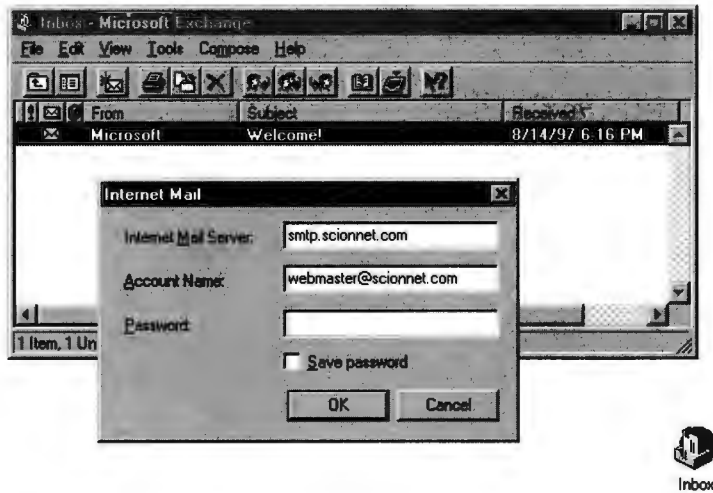


FIGURE 10-52: Logging on to the AppleShare IP Web server from a PC.

## Email Services

PC users can easily log on to the AppleShare IP Mail Server using a Windows 95 POP client. Windows 95 even comes with an email client in the form of Microsoft Exchange, which can be launched by double-clicking on the "InBox" icon.



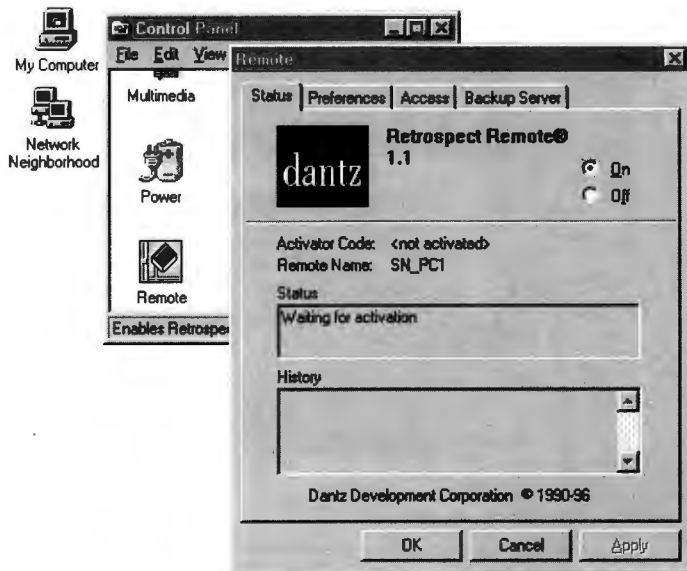
---

FIGURE 10-53: Logging on to the AppleShare IP Mail Server from a PC.

## Backup Services

If you have followed my advice and added your desktop computers to the automated Retrospect backup system, you should consider adding your PC users to this system also. Dantz has a Retrospect client for Windows 95 and NT.





---

FIGURE 10-54: Logging in to the Retrospect backup system from a PC.

## File Sharing

Farallon's Timbuktu Pro, which I mentioned earlier, is probably best known for its screen sharing features, which let network users view and control each other's computers. This feature also works between Mac OS computers and PCs. Figure 10-55 is a screen shot of a Macintosh controlling a PC, which in turn is controlling an AppleShare IP server.

An equally useful feature of Timbuktu Pro is its ability to permit file exchanges between Mac OS computers and PCs directly, in a true peer-to-peer fashion.

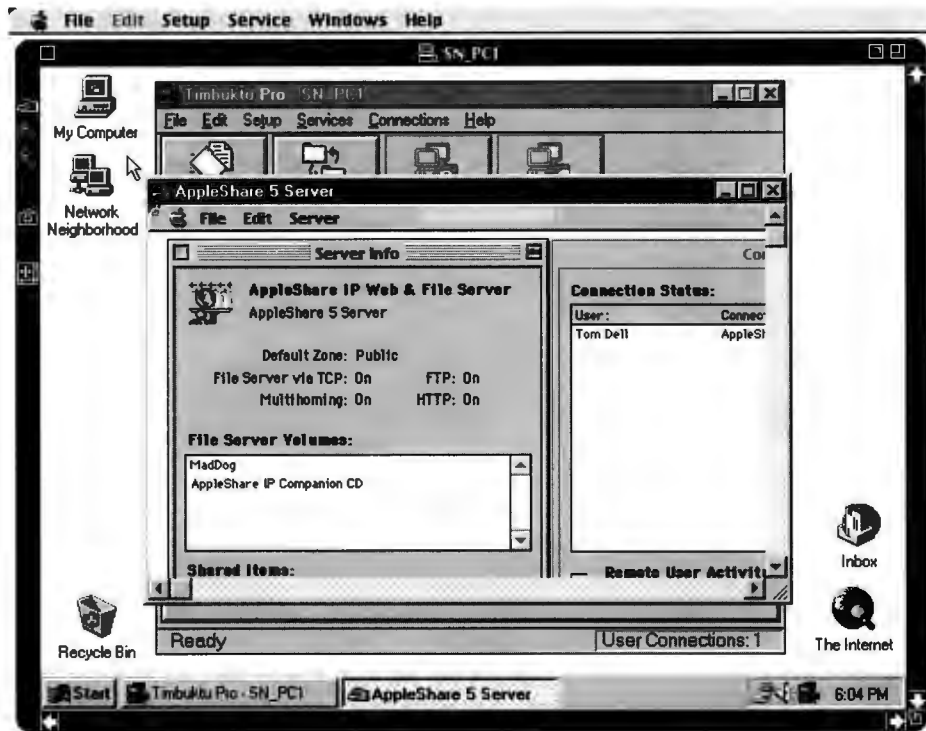


FIGURE 10-55: Controlling a PC from a Macintosh.

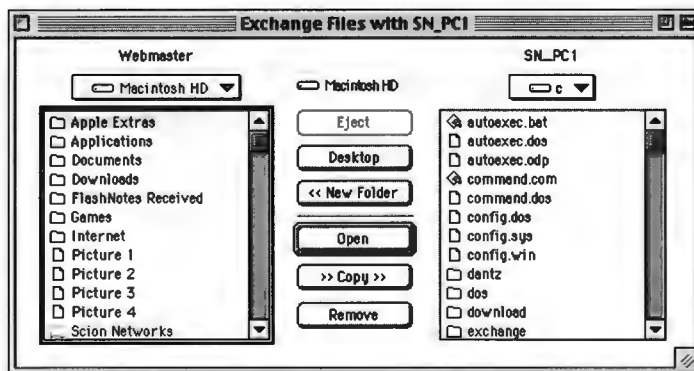


FIGURE 10-56: Exchanging files between a Macintosh and a PC.

Another great feature: Timbuktu Pro automatically assigns the correct file type and creator code-to-suffix mapping information to any files transferred across platforms. If a user creates a document in Microsoft Word for Windows and sends it to a Mac OS user, Timbuktu Pro will make sure the file gets the resource fork it needs to appear on the user's desktop as a double-clickable Word icon. If the file is sent back to the PC user, Timbuktu Pro strips the unneeded resource fork and adds the three-letter DOS extension.

## SUMMARY

There are several ways to permit both Mac OS computers and PCs to share network services. You can install AppleTalk on the PCs, you can install a PC-common protocol on the Mac OS computers, or you can install TCP/IP on both.

If you are preparing to run AppleTalk on a PC, you should be aware of the inherent differences between PCs and Mac OS computers in the way they handle files and folders.

Once an AppleTalk network connection has been established, PC users can exchange files and print to an AppleShare IP server using DOS, Windows 3.1, Windows 95 or Windows NT. Once a TCP/IP connection has been established, additional services become available such as Web services, email, backup and file sharing.



# MacDNS

Which do you find easier to remember: *www.scionnet.com* or *38.247.58.10*?

If you are like most people, you find words easier to remember than numbers. So you should find it easiest to remember the URL of my company's Web server if I give it to you as "*www.scionnet.com*." Both are valid designations for the same computer, representing the Web server's *hostname* and *IP address*, respectively. These designations are wedded by the TCP/IP service known as the *Domain Name System (DNS)*.

At its simplest, DNS is a database that matches up the dotted numerical IP addresses that computers understand with the plain-English hostnames that people like to type. Besides making

machines more recognizable to humans, DNS allows hostname-to-IP address mapping to be altered without interrupting network communications.

For example, imagine that a company decides to move its Web site from a Web hosting service to its own in-house AppleShare IP server. With a small change in the DNS, that hostname can be *resolved* to the in-house server's IP address instead of to the address of the Web hosting service's computer. Regular visitors to the Web site will never know the difference, so long as they continue to use the hostname (e.g., [www.scionnet.com](http://www.scionnet.com)) in the URL.

DNS is not something all network administrators need to manipulate themselves. In many cases, your organization's ISP will handle this. You need only tell the ISP's technicians what a machine's static IP address is (e.g., 38.247.58.3), what you want its hostname to be (e.g., [smtp.scionnet.com](mailto:smtp.scionnet.com)), and perhaps what services it is running (e.g., SMTP, FTP, HTTP, etc.).

If your ISP does not provide full DNS, or if your network is not connected to the Internet, you can provide the service yourself using Apple's MacDNS. This application was installed along with AppleShare IP, but is configured and operated separately. You should find it in the "MacDNS" folder within the "AppleShare IP 5.0" folder.

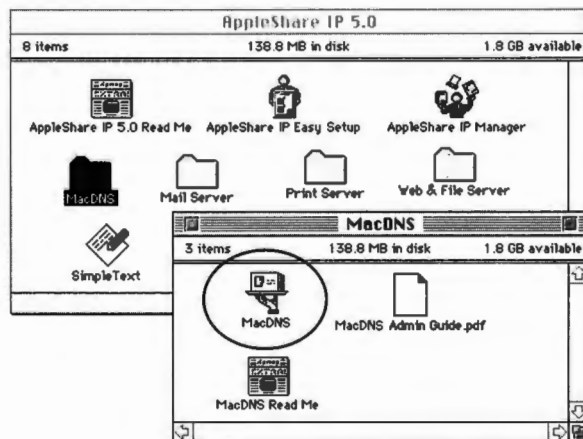


FIGURE 11-1: The MacDNS application.

# DNS AT WORK

DNS is another network service that adheres to the client/server model. In this case, its clients are called *resolvers* and its servers are called *name servers*. Under the MacOS, both Open Transport and MacTCP have domain name resolvers built into them.

Resolvers are used to query the massive worldwide databases collectively referred to as the *domain name space*. First introduced in the 1980s, the DNS was designed to allow for the autonomous local administration of domain names by distributing the responsibility for address mapping across many sites and many computers. This prevents the responsibility for mapping all the world's hostnames from resting with one central authority. More important, it makes it unnecessary for all Internet-based computers to maintain a single file containing the address mappings for all other hosts. Such files would be enormous, as would the amount of network traffic generated to keep them in sync.

The domain name space is hierarchical and can be thought of as like a tree. There is a *root domain*, which can be likened to a tree trunk. From it extend *primary domains*, which can be thought of as branches. From these spring smaller *subdomains*—smaller branches—on which are attached *hosts* like so many leaves.

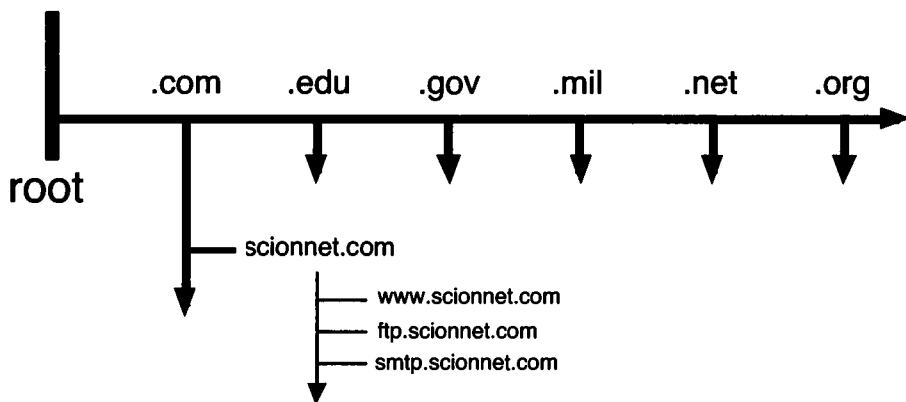


FIGURE 11-2: The DNS hierarchy.

Traffic moves through the DNS hierarchy by following a series of *pointers*. Resolvers point to name servers in the root domain. These powerful name servers are owned by specially designated government, educational, and ISP sites, and in turn point to top-level domain name servers (e.g., .com, .edu, net, .org, etc.), which also reside primarily with governments, universities, big companies, ISPs, and the like. Top-level domain name servers point to name services in their owners' various subdomains (e.g., scionnet.com). It is at this level that MacDNS is useful.

Domain name *queries* originate from resolvers and are sent to name servers. The name servers respond directly if the queries relate to subdomains for which they are *authoritative* (have records for). They act as resolvers themselves if queried about domains for which they are not authoritative.

In Figure 11-2, you can see that my company's name server is authoritative for any host in the scionnet.com domain. When my PowerBook's resolver asks my company's name server for the IP address that matches www.scionnet.com, the name server knows to respond with 38.247.58.10.

When my PowerBook's resolver asks for the IP address that matches www.cie-cais.org, as illustrated in Figure 11-3, things get more complicated. My company's name server is not authoritative for cie-cais.org, so it must forward a query to a root domain name server. That root domain name server refers the query to a name server in another top-level domain, .org, which in turn passes the query to the authoritative name server for cie-cais.org. The authoritative name server for cie-cais.org then resolves the IP address as 38.222.116.3. This information is passed directly back to my PowerBook.

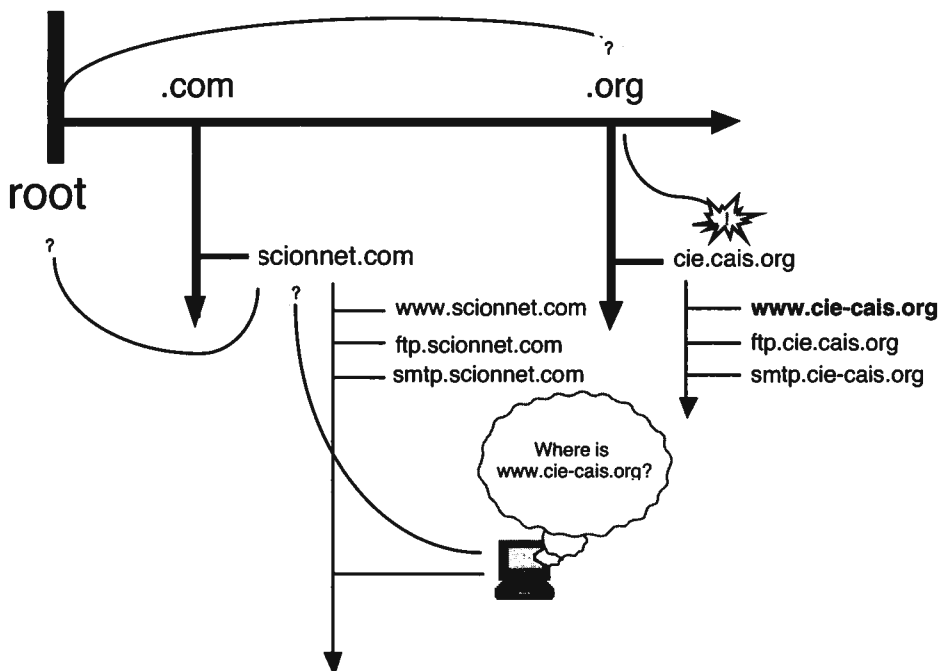


FIGURE 11-3: The recursion process.

The process I just outlined is called *recursion*. My company's name server queried the root domain name server and followed successive pointers until it found a host that knew the answer to my PowerBook's *recursive query*. It used a technique called *iteration* to accomplish this. Iteration is the process whereby the queried name server returns either the requested information or the name of another name server that might have the requested information.

When MacDNS receives a query for information that is not in its database, it calls out to a *parent server*, often that of an ISP, to begin the recursion process. But if it receives a query for information that it has looked up recently, it recalls the requested information from a cache of recent data. Since the whole query process is not duplicated, caching provides for a faster response.



MacDNS can maintain hostname-to-IP address mappings for all hosts in a given *Zone of Authority* (ZOA), which is that part of the domain name space for which a specific name server is authoritative. A network might have one name server responsible for everything in the domain, or it might have multiple name servers, each responsible for different subdomains (zones) within that domain. (These have nothing to do with AppleTalk zones.)

Most domains on the Internet are supervised by at least two name servers, *primary* and *secondary*, so if one goes down the other can maintain DNS. You can set up MacDNS as a primary server. Any secondary domain name servers running on your network can then copy MacDNS' zone information periodically. You cannot set up MacDNS as a secondary name server, however, as it will not import zone information from another name server.

## SETTING UP MACDNS

MacDNS can be run on the same Macintosh that hosts AppleShare IP or on a lesser Macintosh—any one with a 68020, 68030, 68040, or PowerPC processor. It needs just 1,500 Kbytes of RAM, System 7.x or higher, and either MacTCP 2.0.6 or Open Transport 1.1 (or higher). On pre-System 7.5 computers, the Thread Manager 2.0.1 extension is required. A network connection using a static IP address is also necessary, of course.

Once you have chosen your name server Macintosh, it is wise to place an alias of the MacDNS application in the "Startup Items" folder of the System Folder so that it will boot up automatically whenever its host computer is restarted.

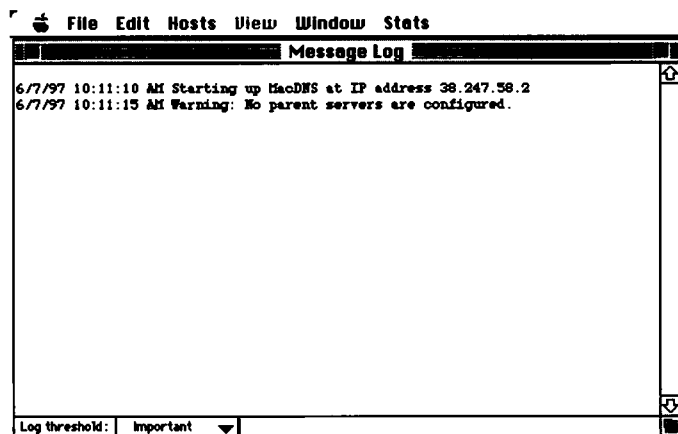
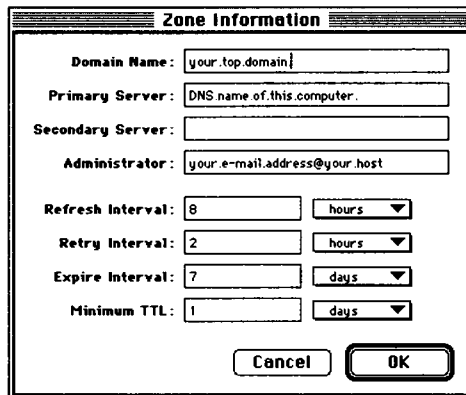


FIGURE 11–4: Initial launch of MacDNS.

After that, you will be ready to configure MacDNS for your specific network. Launch MacDNS, and take note of the messages that appear in the Message Log window. You should see one confirming that the Macintosh has a valid IP address, followed by a warning that “no parent servers are configured.” Before you change that situation, you need to provide MacDNS with details about your particular network, its ZOA.

## Create a Zone File



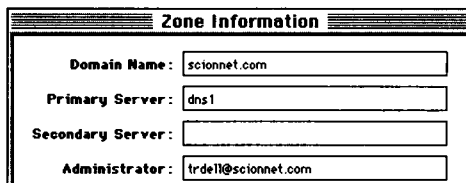
The screenshot shows the 'Zone Information' dialog box. It contains the following fields and values:

Field	Value
Domain Name	your.top.domain
Primary Server	DNS name of this computer.
Secondary Server	
Administrator	your.e-mail.address@your.host
Refresh Interval	8 hours
Retry Interval	2 hours
Expire Interval	7 days
Minimum TTL	1 days

Buttons: Cancel, OK

FIGURE 11-5: The Zone Information dialog box.

To begin, open the Zone Information dialog box by choosing the **New Zone File** command under the **File** menu bar item. Here, type your InterNIC-registered domain name in the **Domain Name** field (e.g., "scionnet.com"). Then enter a hostname for the MacDNS computer in the **Primary Server** field (e.g., "dns1"), which should differ from the name in the Macintosh's Sharing Setup control panel. If MacDNS will be working in conjunction with a secondary server, you may type the name of that server's ZOA in the **Secondary Server** field (e.g., "trdell.com"). Finally, type an email address for the individual who will administer Mac DNS in the **Administrator** field. This will be visible to other DNS administrators who may need to contact your site.



The screenshot shows the 'Zone Information' dialog box with the following example data:

Field	Value
Domain Name	scionnet.com
Primary Server	dns1
Secondary Server	
Administrator	trdell@scionnet.com

## Default Values

The default values in the four fields with pop-up menus are used to keep MacDNS' zone up to date without causing excessive network traffic. You will probably not need to change these.

A screenshot of a configuration window for MacDNS. It contains four rows of settings, each with a label, a text input field, and a pop-up menu. The first row is 'Administrator:' with the text 'trdel@sonnet.com'. The second row is 'Refresh Interval:' with the value '8' and a pop-up menu showing 'seconds', 'minutes', 'days', and 'hours' (selected). The third row is 'Retry Interval:' with the value '2' and a pop-up menu showing 'days' and 'hours' (selected). The fourth row is 'Expire Interval:' with the value '7' and a pop-up menu showing 'days' (selected). The fifth row is 'Minimum TTL:' with the value '1' and a pop-up menu showing 'days' (selected).

The values are as follows.

**Refresh Interval.** The **Refresh Interval** setting determines how often a secondary server will query MacDNS to see if any of its hostname-to-IP address mappings have changed. Whenever there is a change, the secondary server updates its records to reflect this through a *zone transfer*. The recommended setting is **8 hours**.

**Retry Interval.** The **Retry Interval** setting determines the length of time a secondary server will wait after communications with MacDNS fail before trying again. The recommended setting is **2 hours**.

**Expire Interval.** The **Expire Interval** setting determines the length of time during which a secondary server will keep its zone information cached after it has been unable to communicate with MacDNS to perform a zone transfer. You cannot rely on the accuracy of cached DNS information beyond a certain point. The assumption is that it is better for the secondary server to provide no data than to provide obsolete data. Once the interval is reached, the secondary server will purge the data it received from MacDNS from its cache. The recommended setting is **7 days**.

**Minimum TTL.** The **minimum Time to Live (TTL)** determines how long a hostname record in MacDNS' database will be cached. The recommended setting is **1 day**.

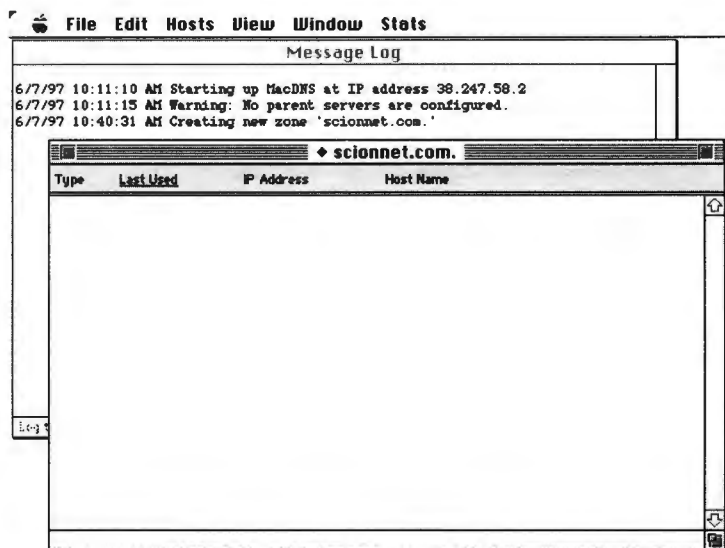


FIGURE 11-6: New Zone List window.

Press the **OK** button when you are finished. Note that a new window will appear with the domain name you typed in the Zone Information dialog box as its title. This is the Zone List window. The title will be preceded by a diamond until you save the list. I suggest that you save this list in the "MacDNS" folder now.

MacDNS can be made authoritative for multiple zones. Simply repeat these steps for each zone and save each Zone List. For example, my company's network has two domain names. The domain name `scionnet.com` is used by most of our computers; the domain name `trdell.com` is used in the training room only. They each get their own Zone List.

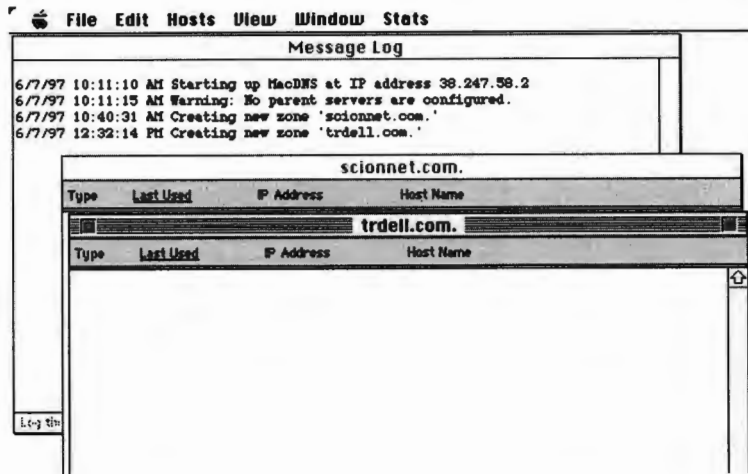


FIGURE 11-7: Two zones on the same IP network.

## Establish the Parent Server

Once you have given your MacDNS name server its identity, you can configure it to communicate with its parent servers. MacDNS relies on these name servers to answer queries about hostname-to-IP address mappings that are not in its own database. Generally, these will be the servers of your organization's ISP, as they are usually able to supply full *recursive name service*, the process illustrated in Figure 11-3. By default, MacDNS looks to the name servers you typed into the TCP/IP (Open Transport) or MacTCP (Classic Networking) control panel when you configured the Macintosh.

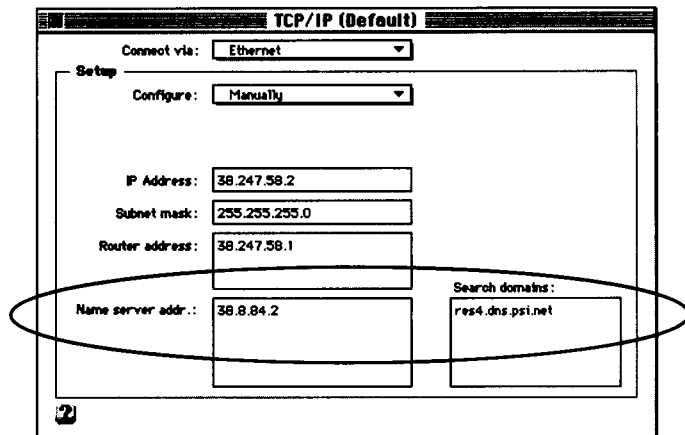
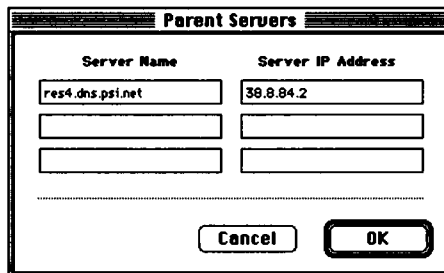


FIGURE 11–8: Name servers in the TCP/IP control panel.

You can configure MacDNS to query additional servers as well. To do this, choose the **Set Parent Servers** command from the **Hosts** menu bar item and enter the name servers' hostnames and IP addresses.



Press the **OK** button when you are done. You will not need to restart the MacDNS application for the changes to take effect.

## Enter Hostname-to-IP Address Mappings

At this point you may create the MacDNS database by entering hostnames for the IP addresses within your network's zone(s). To begin, select the **Add Permanent Host** command from the **Hosts** menu bar item. This will open a Host Information dialog box.

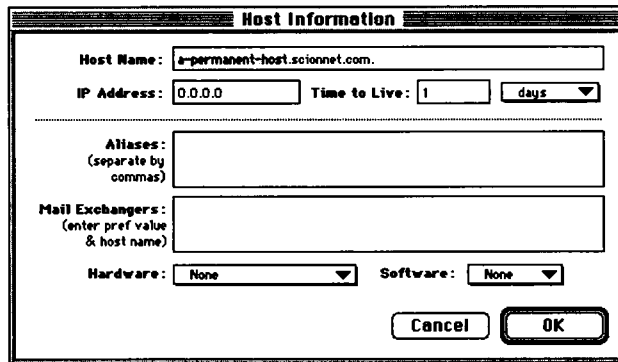
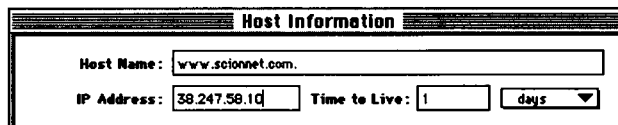
A screenshot of the 'Host Information' dialog box. It has a title bar with the text 'Host Information'. Inside, there are several fields: 'Host Name' with the text 'a-permanent-host.scionnet.com.', 'IP Address' with '0.0.0.0', and 'Time to Live' with '1' and a dropdown menu set to 'days'. Below these are two larger text areas: 'Aliases: (separate by commas)' and 'Mail Exchangers: (enter pref value & host name)'. At the bottom, there are two dropdown menus for 'Hardware' and 'Software', both set to 'None'. At the very bottom right are 'Cancel' and 'OK' buttons.

FIGURE 11–9: Host Information dialog box.

The domain name for the zone will have been entered automatically (e.g., scionnet.com) and the hostname part of the address—the part you need to type in—will be highlighted (e.g., a-permanent-host). Simply type the hostname for a given computer in the **Host Name** field and its IP address in the **IP Address** field. The **Time to Live** field determines how long this information will stay in a name servers' cache before being purged; it adopts the MacDNS setting by default.

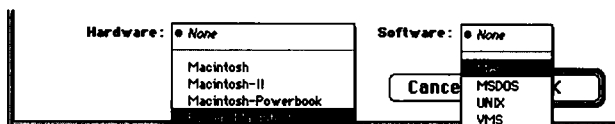
A screenshot of the 'Host Information' dialog box, similar to the one above but with different data. The 'Host Name' field contains 'www.scionnet.com.', the 'IP Address' field contains '38.247.58.1d', and the 'Time to Live' field still shows '1' with the 'days' dropdown. The 'Aliases' and 'Mail Exchangers' fields are empty. The 'Hardware' and 'Software' dropdowns are still set to 'None'. The 'Cancel' and 'OK' buttons are at the bottom right.

Hostnames entered here are not case sensitive, but there are some other rules that you should consider:



- Avoid the use of special (non-alphanumeric) characters—even underscores—in hostnames. A lot of software has trouble with them.
- Keep hostnames short and simple. Domain names are supposed to be easier for humans to remember than IP addresses, so an obscure host-name like “www.sf.hyde.5.scionnet.com” would defeat the purpose.
- To avoid confusion, avoid words that can be spelled in more than one way. For example, one of my favorite Web sites is at “www.lynda.com.” Naturally, when I refer to it in my *Webmaster Workshop*, class a few students will immediately type “www.linda.com” into their browsers. (This is the site of author Lynda Weinman, by the way, whose book *Designing Web Graphics* [New Riders, 1996] I consider a must-read for aspiring Webmasters.)
- Try to use hostnames that are descriptive of the host’s function. “mailhost1.scionnet.com” and “mailhost2.scionnet.com” might be enough to tell someone all they need to know, but “mailhost.smtp.scionnet.com” and “mailhost.pop.scionnet.com” delineate their respective hosts’ duties further still.
- Be aware of the fact that these hostnames are relative to your domain, so hostname conflicts beyond your network are not much of an issue. For instance, “www.apple.scionnet.com” is never going to conflict with “www.apple.com.” Within your network, however, you will have to be careful to maintain a unique hostname and IP address for each computer.

For the convenience of applications that log such information, you can identify the hosts’ hardware and software characteristics by using the pop-up menus at the bottom of the Host Information dialog box. Press the **OK** button when you have finished. Your first record will now appear in the Zone List window.



Type	Last Used	IP Address	Host Name
Perm	11:55:32 AM	38.247.58.10	www.scionnet.com.

It is a good idea to save the Zone List whenever you make a change. The title of the Zone List window will be preceded by a diamond until you do so.

## The Zone List Window

Before we move on, let's take a look at the Zone List window. It displays the following information:

**Type.** Hostnames can be of several types. A permanent (**Perm**) hostname is the one actually mapped to a computer's IP address. Such a host can also have alias (**Alias**) hostnames, giving it multiple identities. When several servers are deployed to share the workload for a given service, they are designated with a **Loadshare** hostname. Finally, a host that does nothing but exchange email is designated with a Mail Exchanger-only (**MX-only**) hostname.

**Last Used.** The data in this column refers to the time the hostname was created, changed, or most recently queried.

**IP Address.** In most cases the host's IP address mapping is listed here. For records not associated with an actual IP address, a dash (—) is used.

**Hostname.** Listed here is the hostname that is mapped to the IP address.

You can change the order in which the information is presented by choosing to sort **By Type**, **By Last Use**, **By IP Address**, or **By Name** under the **View** menu bar item, or by clicking on the appropriate column heading.

Here is perhaps the most important thing to remember about this window: *If you close it, you shut down the name service for its zone even if*

MacDNS is still running! If you want to reduce the clutter on your screen, you can choose the **Hide Window** command from the **Window** menu bar item instead. Selecting its name under the **Window** menu bar item makes it reappear.

Window	Stats
Move To Back	⌘B
Hide Window	
Look Up Host	⌘L
Message Log	
Cached Hosts	
scionnet.com.	
trdell.com.	

At this point we have created what is called an *address (A)* resource record. Specifically, I have mapped the hostname `www.scionnet.com` to a Macintosh running AppleShare IP and having the IP address `38.247.58.10`. Of course, since it is an AppleShare IP server, it is also running FTP. I need a hostname that makes sense to file server users also.

## Aliases

This is where the alias comes in handy. To create it, I simply re-open the Host Information window and type the secondary designation in the **Aliases** field. You can add several hostnames here, so long as they are separated by commas.

Aliases:  
(separate by  
commas)

ftp.scionnet.com

You cannot add an alias name that does not include the real domain name of the host. For example, I can use `"ftp.scionnet.com"` as an alias to `"www.scionnet.com,"` but I cannot use `"www.trdell.com"` as an alias because `trdell.com` is not part of the `scionnet.com` zone (even though it uses the same IP addresses). Instead, I have to create a Zone List file for the `trdell.com` zone and add `"www.trdell.com"` to it as a permanent host. I can then assign it to the IP address used by my AppleShare IP server, `"38.247.58.10."`

scionnet.com.			
Type	Last Used	IP Address	Host Name
Perm	11:55:32 AM	38.247.58.10	www.scionnet.com.
Alias	11:55:32 AM	38.247.58.10	ftp.scionnet.com.

trdell.com.			
Type	Last Used	IP Address	Host Name
Alias	1:13:11 PM	38.247.58.10	ftp.trdell.com.
Perm	1:13:11 PM	38.247.58.10	www.trdell.com.

## Mail Exchangers

Yet another type of entry is the *Mail Exchanger (MX)* record, which is used for the exchange of email.

Email is not always sent directly from one host to another, but is often relayed through several intermediate hosts. These relay computers are *mail exchangers*. DNS assigns a different priority to each mail exchanger host, depending on how desirable it is for that host to receive email. The most desirable host is always the destination host, of course, but what if that host is unavailable? In that event, email can be sent to a relay host that will hold it until the destination host is available.

This system is vital to the many networks that use *dial-on-demand* Internet service. Under this system the organization's Internet router "calls" the ISP at specified intervals and email is exchanged between a local mail host and the ISP's relay mail host. The router then disconnects and the work of getting the email to its ultimate destination is left with the ISP's mail host.

For example, my company's mail server resides on a local Macintosh called smtp.scionnet.com. Whenever it is up, it contacts other mail hosts directly over my company's full-time Internet feed. On the rare occasions when it is down, my ISP collects the email for us. The PSInet mail host we use is called relay.smtp.psi.net.

It is the job of MacDNS to make this arrangement known to my company's hosts. In the **Mail Exchangers** field, I type:

10 smtp.scionnet.com, 20 relay.smtp.psi.net

In other words, the first choice for our domain's MX host is smtp.scionnet.com; the second choice is relay.smtp.psi.net. The order of preference is determined by the priority "10," which is lower than that of the other host's "20." This is an important rule: The *lower* the number the *higher* the priority.

**Mail Exchangers:** 10 smtp.scionnet.com, 20 relay.smtp.psi.net  
(enter pref value & host name)

What you actually use for a number is irrelevant, although it is wise to leave some numbers between them in case you choose to slip in a new MX host later. For instance, because I have used the priority numbers of "10" and "20," my company can easily deploy another MX host at priority "15." If I had used "1" and "2" instead, this would not be possible.

There is one more use for the MX record. In the MacDNS program you can designate computers that need mail exchange service only (and no other Internet services) as *MX-only hosts*. This is useful when you do not want to map your domain name itself to an actual host computer. Instead, you use the domain name as the MX-only host and the name of your local mail host as the mail exchanger. Create this type of record by choosing the **Add MX-Only Host** command from **Hosts** menu bar item.

**MX-Only Host Information**

Host Name:

Time to Live:  days ▾

Mail Exchangers:   
(enter pref value and host name)

Enter the data as you would for a permanent host record, minus the IP address and alias information. Press **OK** when you have finished.

scionnet.com.			
Type	Last Used	IP Address	Host Name
Perm	11:55:32 AM	38.247.58.10	www.scionnet.com.
Alias	11:55:32 AM	38.247.58.10	ftp.scionnet.com.
MX-only	1:58:11 PM	---	scionnet.com.

## Load-Balancing, Round Robin, and RAICs

If a service is used heavily on your network, you may wish to distribute the workload across multiple servers. MacDNS permits you to do this by establishing *load-sharing groups* composed of several hosts within its zone. When so configured, MacDNS will return the address of one host out of a group sequentially whenever it is queried for the name of that group.

For example, I might set up three Macintosh computers to act as identical Web servers on my network, and then assign a name to this server group. When queried, MacDNS will respond with the IP of one the three hosts in what is referred to as *round-robin*. This effectively creates a *Redundant Array of Independent Computers (RAIC)* system capable of supporting as much as three times the traffic handled by a stand-alone server.

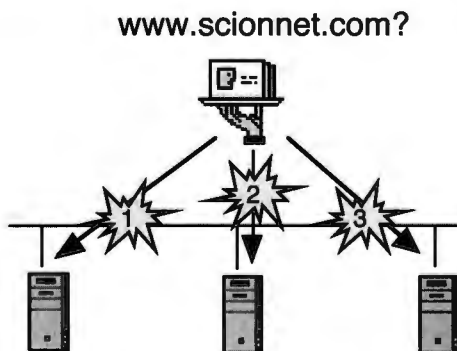
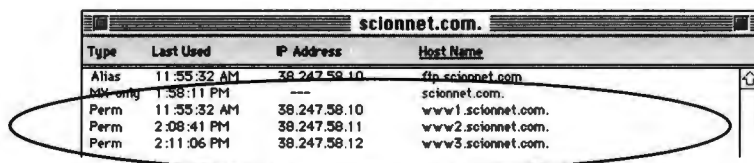


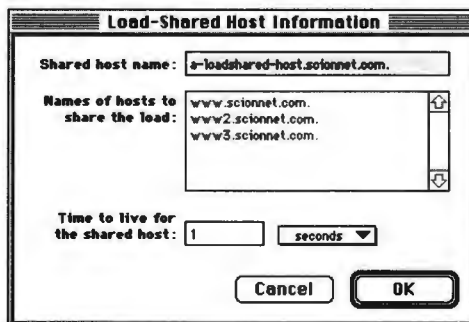
FIGURE 11-10: MacDNS and the RAIC.

To create a RAIC, I might begin by entering each host in MacDNS as "www1.scionnet.com," "www2.scionnet.com," and "www3.scionnet.com." Once I have established the DNS entries for each host, I click on the **Host Name** column heading so that they are all listed sequentially.



Type	Last Used	IP Address	Host Name
Alias	11:55:32 AM	38.247.58.10	ftp.scionnet.com.
MX-only	1:58:11 PM	---	scionnet.com.
Perm	11:55:32 AM	38.247.58.10	www1.scionnet.com.
Perm	2:08:41 PM	38.247.58.11	www2.scionnet.com.
Perm	2:11:06 PM	38.247.58.12	www3.scionnet.com.

Next, I highlight them in the Zone List window while holding down the **Shift** key. Then I choose the **Share Load** command from the **Hosts** menu bar item. Doing this will open the Load-Shared Host Information dialog box.



**Load-Shared Host Information**

Shared host name:

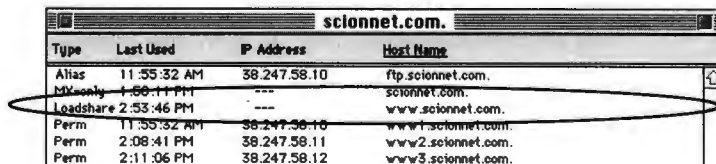
Names of hosts to share the load:

- www1.scionnet.com.
- www2.scionnet.com.
- www3.scionnet.com.

Time to live for the shared host:  seconds

Here I type the name of the load-sharing group, “www.scionnet.com,” in the **Shared hostname** field. When configuring load-sharing groups, you generally want to set the **Time To Live** setting to just a few seconds. This prevents the information about any one host from being kept too long in the cache of any remote name server, which would defeat the round robin mechanism.

I press the **OK** button to complete the process, and a new listing is entered in the Zone List window.



Type	Last Used	IP Address	Host Name
Alias	11:55:32 AM	38.247.58.10	ftp.scionnet.com.
MX-only	1:58:11 PM	---	scionnet.com.
Loadshare	2:53:46 PM	---	www.scionnet.com.
Perm	11:55:32 AM	38.247.58.10	www1.scionnet.com.
Perm	2:08:41 PM	38.247.58.11	www2.scionnet.com.
Perm	2:11:06 PM	38.247.58.12	www3.scionnet.com.

Problems occur when one of the servers in a load-sharing group is down. When this happens, you should remove the hostname from the group temporarily so that queries are not routed to that computer. To do this, select the hostname in the Zone List window, then select the **Disable Sharing** command from the **Hosts** menu bar item.



Type	Last Used	IP Address	Host Name
Alias	4:18:08 PM	38.247.58.10	ftp.scionnet.com.
MDX-only	4:18:08 PM	---	scionnet.com.
Loadshare	4:18:08 PM	---	www.scionnet.com.
Perm	4:18:08 PM	38.247.58.10	www1.scionnet.com.
Perm	4:18:08 PM	38.247.58.11	X www2.scionnet.com.
Perm	4:18:08 PM	38.247.58.12	www3.scionnet.com.

The disabled computer will be listed with an “X” next to its hostname. It is still part of the load-sharing group, but MacDNS will no longer return an address for that host when the load-sharing group name is queried. MacDNS *will* respond with the proper information if the request is for the host itself (e.g., `www2.scionnet.com` instead of just `www.scionnet.com`).

To return the hostname to service, simply reverse the process and select **Enable Sharing** under the **Hosts** menu bar item.

## IP Address-to-Hostname Mapping

At this point you should have a good idea of how hostname-to-IP address mapping works, but what about the reverse: *IP address-to-hostname mapping*?

A special Internet domain name is set aside for just this purpose: *in-addr.arpa*. Domains here are represented by network numbers in reverse. For example, the *in-addr.arpa* domain for my company’s network at 38.247.58.0 is 58.247.38.in-addr.arpa. Just as a name server is responsible for the hostname-to-IP address mappings within its ZOA, it is usually also charged with the IP address-to-hostname mappings in this *reverse domain*.

Confused? That’s okay. One of the nice things about MacDNS is that it automatically maintains reverse domains for you. Unlike with some other



applications, you do not need to create a separate zone file for your in-addr.arpa domain and keep it synchronized.

There is one small catch. When MacDNS is serving multiple zones in which two or more permanent host entries are mapped to the same IP address, it searches for the first matching hostname associated with the IP address (starting in the zone that was opened first) and returns that to a reverse domain query. For example, where the hosts `www.scionnet.com` and `www.trdell.com` both have the IP address of `38.247.58.10`, a reverse domain name lookup will return whichever hostname is in the Zone List that was opened first. In my company's case this is `www.scionnet.com`.

## Test the Name Server

Once you think you have your name server set up the way you want it, you should test the installation with a ping utility. My favorite is OTTool from Neon Software (<http://www.neon.com>). Similar to MacPing (which you can use on MacTCP machines), it is Open Transport-friendly, feature-packed, and free! (You can register by emailing your name, company name, address, and phone number to [ottool@noen.com](mailto:ottool@noen.com).)

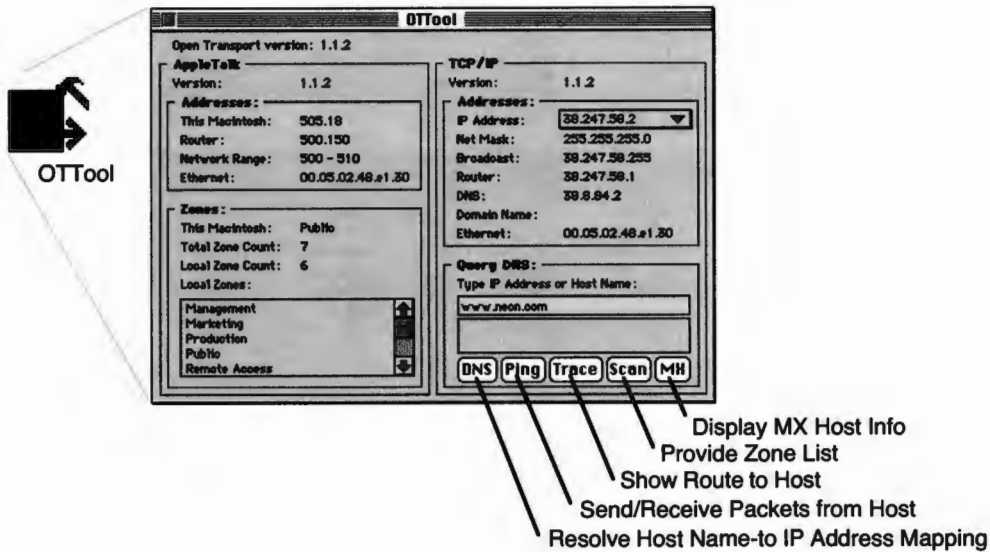
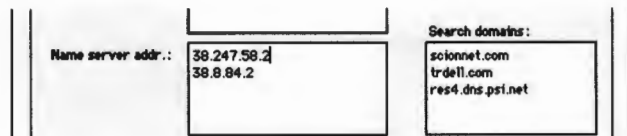


FIGURE 11-11: Neon Software's OTTool.

To test your MacDNS setup using this utility, copy it to a remote Macintosh that is running Open Transport somewhere on your network. Next, configure the Macintosh's TCP/IP control panel to use your MacDNS Macintosh as its primary name server.



## The OTTool Tests

Now you may launch OTTool and perform five handy tests using the buttons in the lower right corner of the application's main window.

**DNS.** This test will resolve the hostname-to-IP address mapping or IP address-to-hostname of a given host. Type in the hostname of a computer on your network and press the **DNS** button. If you have configured MacDNS correctly, it will respond with that host's IP address.

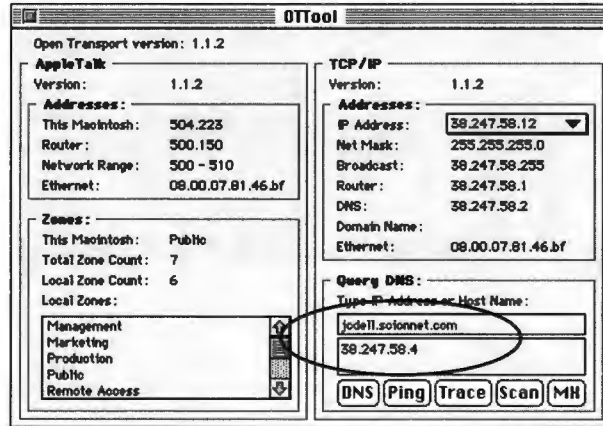


FIGURE 11-12: A DNS look-up.

**Scan.** To review MacDNS' entire zone table, type the hostname for the lowest numbered host on your network and press the **Scan** button.

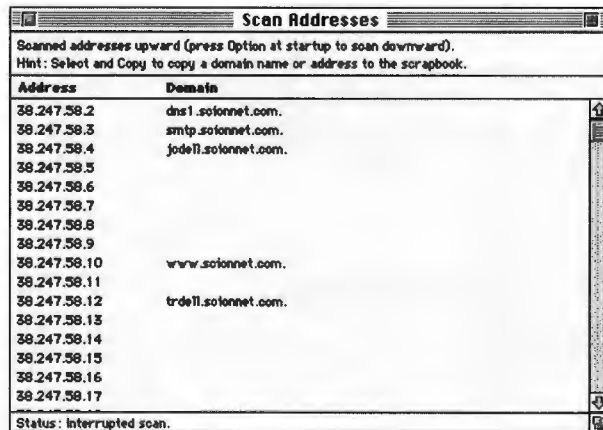


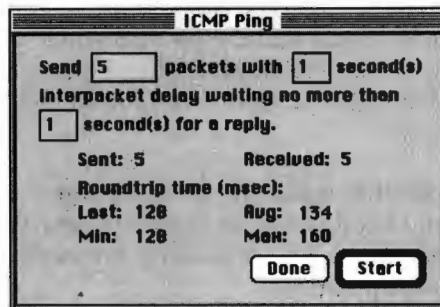
FIGURE 11-13: A DNS database scan.

**MX.** To see the Mail Exchanger (MX) and Hardware Information (HINFO) resource records associated with a given host, type in the host-name and press the MX button.

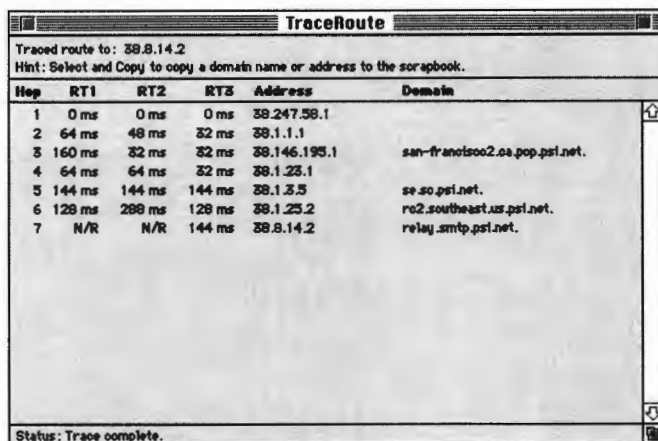


FIGURE 11-14: MX and HINFO.

**Ping.** If your computer is unable to communicate with one of your network's hosts, you can verify that it is on the network by typing in its host-name and pressing the Ping button. This will send a series of sonar-like packets to the host, which should respond in kind.



**Trace.** You can view the path network traffic is taking as it moves between your host and a remote host by typing the Internet host's name and pressing the Trace button.



Traced route to: 38.8.14.2					
Hint: Select and Copy to copy a domain name or address to the scrapbook.					
Hop	RT1	RT2	RT3	Address	Domain
1	0 ms	0 ms	0 ms	38.247.58.1	
2	64 ms	48 ms	32 ms	38.1.1.1	
3	160 ms	32 ms	32 ms	38.146.195.1	san-francisco2.ca.pop.psi.net.
4	64 ms	64 ms	32 ms	38.1.23.1	
5	144 ms	144 ms	144 ms	38.1.3.5	se.so.psi.net.
6	128 ms	288 ms	128 ms	38.1.23.2	re2.southeast.us.psi.net.
7	N/R	N/R	144 ms	38.8.14.2	relay.smtp.psi.net.
Status: Trace complete.					

FIGURE 11-15: A trace route.

The information you can gather with OTTool can be helpful when it comes to network troubleshooting.

## Look Up Hosts with MacDNS

OTTool should be set up on a remote computer so that it queries MacDNS and thereby permits you to double-check your work. Once you know MacDNS is properly configured, however, you can use MacDNS instead of OTTool or MacPing to look up basic information about other hosts.

To do this, select the **Look Up Host** command from under the **Window** menu bar item. In the Look Up Host window that appears, type the name of the host you are looking for in the **Host name** field. Next, press the **Look Up** button.

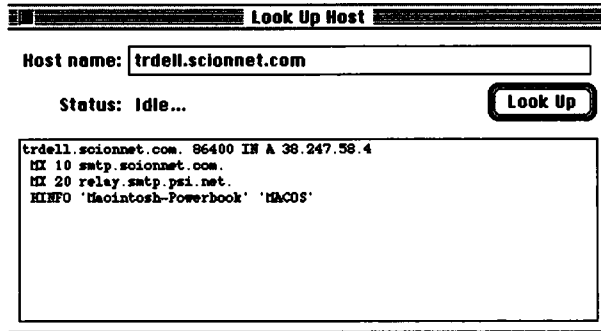


FIGURE 11-16: Look Up Host from MacDNS.

MacDNS will look in its own database first, then query a parent server should this fail to provide a hostname-to-IP address mapping.

## MONITORING MACDNS

Once you have MacDNS set up, it is quite self-sufficient. Nevertheless, there are a few things you can do to monitor its day-to-day operations.

### View the Message Log

MacDNS tracks significant events in its Message Log window. If it is not open already, you can view it by choosing the **Message Log** command from under the **Window** menu bar item.

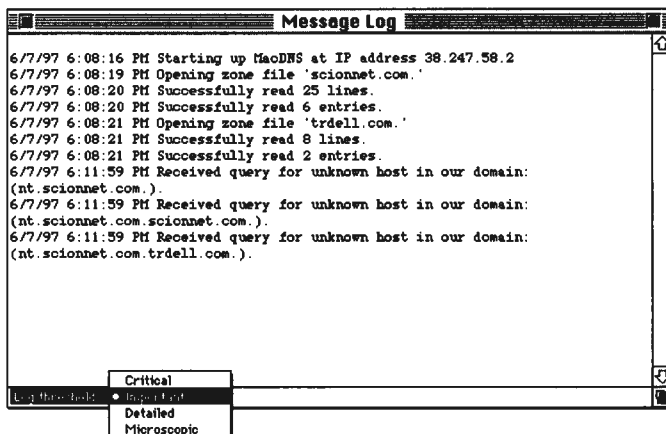


FIGURE 11-17: The Message Log window.

The pop-up menu in the lower left controls four levels of detail. **Critical** displays only significant changes or errors. **Important** displays critical messages as well as erroneous queries, low MacDNS memory, and a few others. **Detailed**, in addition to all critical and important messages, displays a one-line summary of every request that is processed as well as time-outs for entries in the MacDNS cache. **Microscopic** displays all possible messages in the greatest detail. This setting is useful in debugging.

All information displayed here is also recorded in a text file that is automatically created in the same folder that contains the MacDNS application.

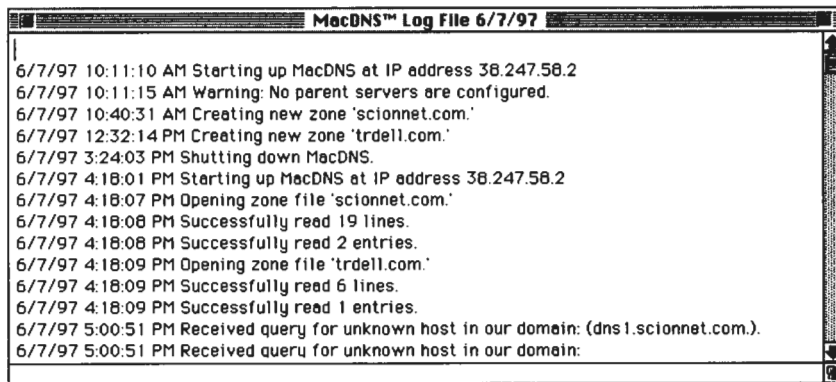


FIGURE 11-18: MacDNS creates text file logs daily.

## View Server Statistics

In addition to the data recorded automatically in the Message Log window, you can also direct MacDNS to display some specific server statistics. The commands for this are found under the **Stats** menu bar item.

### Show Query Counts

If you choose the **Show Query Counts** command, MacDNS will present in the Message Log a summary count of all queries it has received from computers on your network.



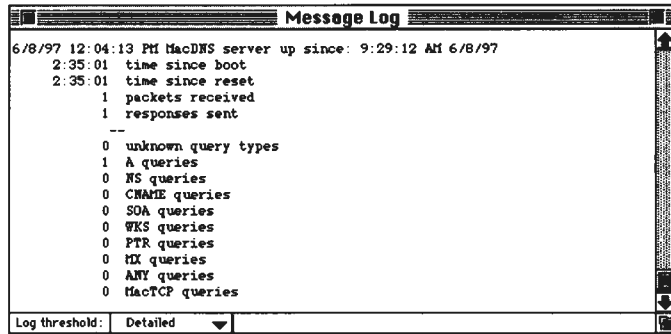


FIGURE 11-19: Query counts.

The types of queries listed refer to the following types of resource records:

**Unknown.** MacDNS has no idea what these queries were about.

**A (Address).** The same as a MacDNS permanent host record. This is a simple hostname-to-IP address mapping.

**NS (Name Server).** This record lists the domain name servers in a given domain.

**CNAME (Canonical Name).** This record lets you define an *alias* for an actual (*canonical*) hostname stored elsewhere in an A record of the Hosts file.

**SOA (Start of Authority).** This record tells other domain name servers which is authoritative for a given domain.

**WKS (Well Known Services).** This record reports what services are running on a given host (e.g., FTP, Telnet, etc.).

**PTR (Pointer).** This record is used in reverse domain name mapping.

**MX (Mail Exchanger).** This record points to the hosts that can accept email for a given domain.

**MacTCP.** This denotes a query from a MacTCP resolver.

## Show Requesters

If you choose the **Show Requesters** command, MacDNS will show you the IP addresses of all computers that have requested information.

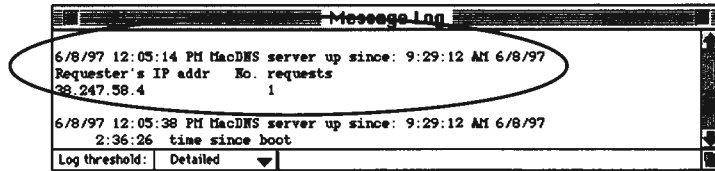


FIGURE 11–20: Requesters.

## Trap Packets

The Message Log can help you identify problems, but additional tools are needed to actually troubleshoot them. One of the best ways to troubleshoot network communications is to watch the contents of packets going to and from affected computers using a *packet sniffer*, such as Neon Software's EtherPeek or AG Group's NetMinder Ethernet. While MacDNS cannot compete with these commercial products, it does have a handy trap feature that can track and display the contents of certain packets moving between a host and the name server.

To use this feature, choose the **Trap Packets** command from under the **Stats** menu bar item. In the Trap Packets dialog box that appears, enter the number of packets you wish to examine in the **Trap the next** field, up to 100. Enter the IP address of the requester computer in the **from IP address** field, or leave the field blank if you want to trap packets from all requesting IP addresses. Enter a hostname for the DNS query in the **for DNS name** field, or again, leave the field blank to capture packets for many queries. Finally, press the **OK** button.

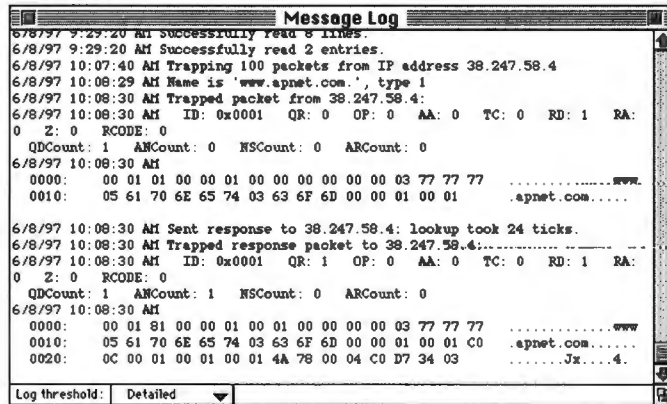


FIGURE 11-21: Trapped packets displayed.

The Message Log window will now display various result codes for the trapped packets, along with the data in those packets. Of all the messages displayed, the ones I find most useful are:

**ID.** This identifier is assigned by an application when it generates a query. It is duplicated in the corresponding reply so that it can be used by the requester to match up replies with outstanding queries.

**QR.** This indicates either a query (0) or a response (1).

**OP.** This specifies the kind of query in a message. It is created by the originator of the query and duplicated in the response. A value of 0 denotes a standard query (QUERY). A value of 1 denotes an inverse query (IQUERY). A value of 2 denotes a server status request (STATUS).

**RCODE.** This, the *Response Code*, is a response value. A 0 denotes *no error*. A 1 indicates a *format error*—the name server was unable to interpret the query as a result. A 2 indicates a *server failure*—the name server was unable to process the query because of a problem within the name server. A 3 indicates a *name error*, meaningful only in responses from authoritative name servers—it indicates that the domain name referred to in the query does not exist. A 4 means *not implemented*—the name server does not support the kind of query that was requested. A 5 means *refused*—the name server refuses to perform an operation because it has been programmed not to.

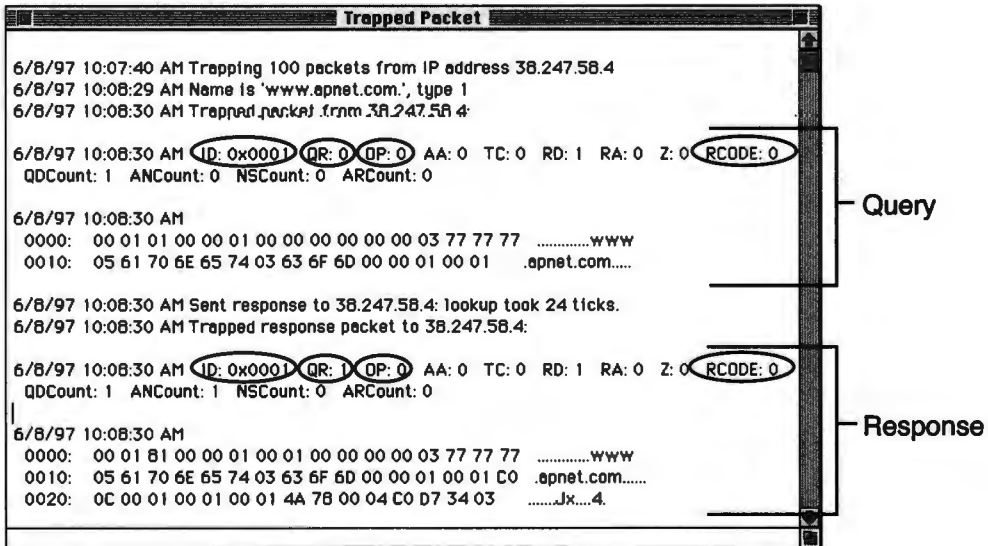
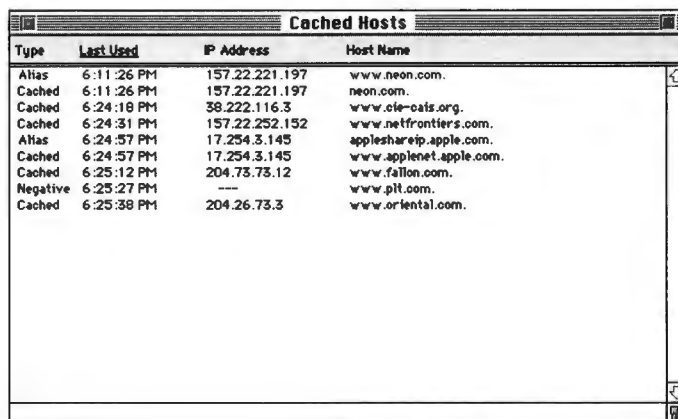


FIGURE 11-22: Codes in Trapped Packet.

## View the Cache

As I explained earlier, when MacDNS receives information from a parent server it stores it in a cache for a specific length of time. To view the information in the cache, choose the **Cached Hosts** command under the **Window** menu bar item.

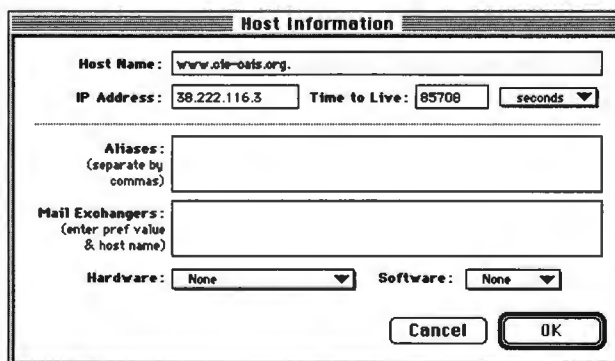


Type	Last Used	IP Address	Host Name
Alias	6:11:26 PM	157.22.221.197	www.neon.com.
Cached	6:11:26 PM	157.22.221.197	neon.com.
Cached	6:24:18 PM	38.222.116.3	www.cle-oasis.org.
Cached	6:24:31 PM	157.22.252.152	www.netfrontiers.com.
Alias	6:24:57 PM	17.254.3.145	appleshareip.apple.com.
Cached	6:24:57 PM	17.254.3.145	www.apple.net.apple.com.
Cached	6:25:12 PM	204.73.73.12	www.fallon.com.
Negative	6:25:27 PM	---	www.plt.com.
Cached	6:25:38 PM	204.26.73.3	www.oriental.com.

FIGURE 11-23: Contents of the MacDNS cache.

Entries are listed as several types. Most will be listed as **Cached**, and some will be listed as **Negative**, meaning that the parent server has reported that there is no such hostname. *No Response (NoResp)* entries are shown whenever MacDNS could not get a response from any parent server about a query.

Double-clicking on an entry will open a Host Information dialog box for it, but no values within it can be changed. This is useful when you want to see what an entry's TTL is.



Host Information	
Host Name:	www.cle-oasis.org.
IP Address:	38.222.116.3
Time to Live:	85708 seconds
Aliases: (separate by commas)	
Mail Exchangers: (enter pref value & host name)	
Hardware:	None
Software:	None
<div>Cancel</div> <div>OK</div>	

FIGURE 11-24: Host information for a cached hostname.

## SUMMARY

MacDNS is bundled with AppleShare IP and can be used to map host-names with IP addresses throughout your network. It acts as a primary name server to multiple zones (domains) and is capable of providing zone transfers to secondary name servers. MacDNS does not provide recursive name service, but can be used in conjunction with parent servers that do.





# RunShare

AppleShare servers are commonplace in publishing and graphics firms. If you ask administrators if they have any complaints about their server, many will respond, "It could be faster on the network." Considering that these people routinely copy and print 100-Mbyte or larger files over the network, you can understand their predicament. Fortunately, there is a solution from RUN, Inc., called RunShare.

Think of RunShare as a network accelerator. Installing it on your server and workstations can significantly reduce the time it takes to transfer files between them without compression and with no threat to data integrity. It does not matter what your network's physical configuration is, so long as it is running AppleTalk. Four-fold performance gains are typical on 10-Mbps Ethernet networks,



according to Run, with gains of more than five times possible over 100-Mbps Ethernet. You can achieve more than 50 Megabytes per minute on Ethernet and more than 100 Megabytes per minute on Fast Ethernet, Run claims, depending on the power of the computers on which the program has been installed.

RunShare offers particular benefits to publishing users, as it reduces the time required to copy files between two Mac OS computers using the Finder and the time required to open or save files from desktop publishing applications over the network. It also accelerates the speed of workstation communications with print spoolers.

This is somewhat expensive software. In a fast-paced production environment, however, the speed gains promised by RunShare are probably worth the investment.

## HOW RUNSHARE WORKS

RunShare was designed around the idea that standard networks such as Ethernet are not inherently slow but are hampered by a bottleneck at the processor. They can deliver AppleTalk packets to the network only at a modest rate. RunShare overcomes this limitation by reducing the idle time between data packets. This does not change the data, so RunShare is compatible with all AppleTalk networking standards. It works with switches, bridges, and routers without modification.

According to RUN, RunShare allows you to copy a file across the network as quickly as you can copy a file to a local hard drive.

## INSTALLING RUNSHARE

RunShare can be purchased in either a peer-to-peer or a client/server version. Both are transparent to the user except for a “running man” icon that replaces the cursor during a file transfer. RunShare is compatible with NuBus- and PCI-equipped Mac OS computers, with or without Open Transport.

### RunShare

RunShare can be used to accelerate the speed of file transfers between workstations, and it can be used as the client to a special server version. In its peer-to-peer form, it works well with Personal File Sharing.

### RunShare Graphic Server Accelerator

While the RunShare workstation software will handle only one request at a time, the server version can handle multiple simultaneous file transfer requests. This is the RunShare Graphic Server Accelerator (GSA) configuration, which can be purchased bundled with an Apple Workgroup Server.

## WORKING WITH RUNSHARE

RunShare’s operations are controlled from a control panel. Press the **Start/Stop** button to enable or disable it.

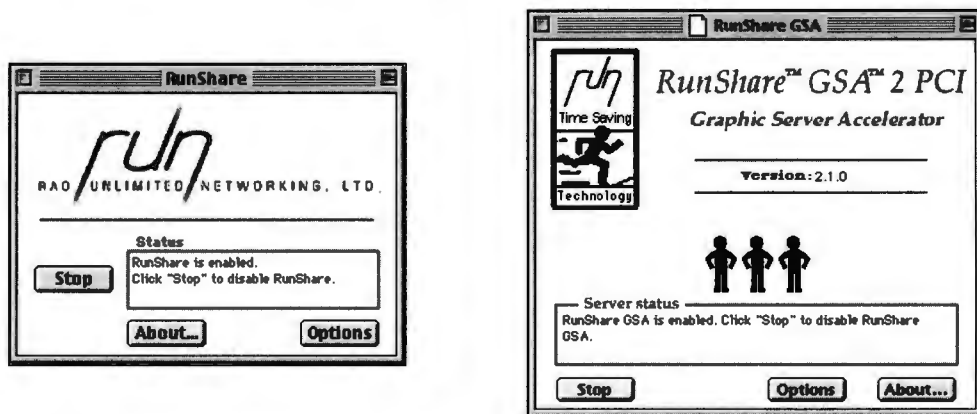
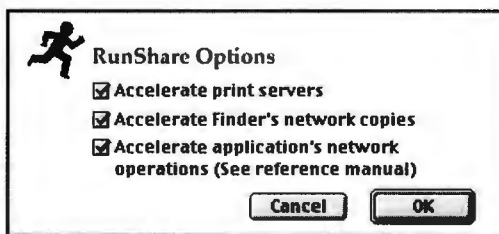


FIGURE 12-1: Viewing the RunShare control panel.

Also in the control panel's main window is an **Options** button. Press it to enable or disable some of RunShare's specific capabilities.



In order to improve file transfer time between the workstation and print spoolers, the **Accelerate print spoolers** checkbox must be selected.

To speed up the Computer's Finder copying operations, the **Accelerate Finder's network copies** checkbox must be selected.

To reduce the time it takes for applications to open and save files over the network, enable the **Accelerate application's network operations** checkbox.

You should not disable any of these except when troubleshooting.

## SUMMARY

RunShare can be described as a network accelerator. It makes file transfers between RunShare-equipped computers about four times as quickly as can conventional AppleTalk network transfers. This is particularly useful in publishing and production environments.



# Appendix

Here is the contact information for the makers of products covered in this book. Some of these vendors have included demos and other information on this book's accompanying CD-ROM.

## **Adobe Systems, Inc.**

Developer of the **Acrobat** electronic publishing program and the **Adobe Type Manager** font management utility.

- Voice: (800) 521-1976
- URL: <http://www.adobe.com>



Adobe Acrobat Reader with Adobe Type Manager on the CD.

## Aladdin Systems, Inc.

Developer of the **StuffIt** file compression utility.

- Voice: (408) 761-6200
- Email: [sales@aladdinsys.com](mailto:sales@aladdinsys.com)
- URL: <http://www.aladdinsys.com>



StuffIt Expander and DropStuff with Expander Enhancer on the CD.

## AP Professional

The publisher of this book as well as others mentioned in the text:

*AppleScript Applications*, by John Schettino and Liz O'Hara. ISBN: 0-12-623957-6.

*AppleTalk Network Services*, by Dorian J. Cougias, Tom Dell, and E.L. Heiberger. ISBN: 0-12-192570-6.

*Claris Em@iler Companion*, by Tom Dell. ISBN: 0-12-208865-4.

*Claris Home Page Companion*, by Maria Langer. ISBN: 0-12-436565-5.

*Complete Guide to Macintosh Backup Management, Second Edition*, by Dorian J. Cougias and Tom Dell. ISBN: 0-12-192562-5.

*Designing AppleTalk Network Architectures*, by Dorian J. Cougias, Tom Dell, and E.L. Heiberger. ISBN: 0-12-192566-8.

*Managing AppleShare & Workgroup Servers*, by Dorian J. Cougias and Tom Dell (out of print).

*Network and Internet Security*, by Vijay Ahuja. ISBN: 0-12-045595-1.

*TCP/IP Clearly Explained, Second Edition*, by Pete Loshin. ISBN: 0-12-455835-6.

- Voice: (800) 3131-APP
- Email: [app@acad.com](mailto:app@acad.com)
- URL: <http://www.apnet.com/approfessional>

## **Apple Computer, Inc.**

Developer of the **Mac OS**, **AppleShare**, **AppleShare IP**, and the **Apple Workgroup Server**.

- Voice: (800) 500-7078
- URLs: <http://appleshareip.apple.com>, <http://www.servers.apple.com>



White Paper and Data Sheets on the CD.

## **Claris Corp.**

Developer of the **Em@iler** email client, **FileMaker Pro** database program, and **Home Page** HTML editor.

- Voice: (408) 727-9054
- URL: <http://www.claris.com>

## **COPS, Inc.**

Developer of the **COPSTalk** AppleTalk protocol stack for PCs.

- Voice: (770) 840-0810
- Email: [support@copstalk.com](mailto:support@copstalk.com)
- URL: <http://www.copstalk.com>



Trial version on the CD.

## **Dantz Development Corp.**

Developer of the **Retrospect** network backup system.

- Voice: (510) 253-3000
- Email: [sales@dantz.com](mailto:sales@dantz.com)
- URL: <http://www.dantz.com>



Product information on the CD.



## Dartmouth College/Jim Matthews

Developer of the **Fetch** FTP client.

- Voice: (603) 646-1999
- Email: [jim.matthews@dartmouth.edu](mailto:jim.matthews@dartmouth.edu)
- URL: <http://www.dartmouth.edu/pages/softdev/fetch.html>

## Datawatch Corp.

Developer of the **netOctopus** network management system and the **Virex** anti-virus application.

- Voice: (508) 988-9700
- URL: <http://www.datawatch.com>



Product information on the CD.

## Entropy Software/Greg Combs

Developer of the **Count WWebula** counter CGI.

- Email: [grgcombs@kagi.com](mailto:grgcombs@kagi.com)
- URL: <http://www.io.com/~combs/htmls/counter.html>



Shareware on the CD.

## Farallon Computing, Inc.

Developer of the **Timbuktu Pro** remote management application.

- Voice: (510) 814-5000
- Email: [sales@farallon.com](mailto:sales@farallon.com)
- URL: <http://www.farallon.com>



Trial software on the CD.

## **Gopher/University of Minnesota**

Developer of the **Gopher** and **TurboGopher** Gopher clients.

- URL: <http://www.shareware.com>

## **Graphic Converter/Thorsten Lemke**

Developer of the **Graphic Converter** file conversion utility.

- Voice: +49-5171-72200
- Email: [lemkesoft@aol.com](mailto:lemkesoft@aol.com)
- URL: <http://www.goldinc.com/Lemke/gc.html>



Shareware on the CD.

## **Hewlett Packard Co.**

Maker of the **LaserJet** and **DeskJet** printers.

- Voice: (800) 752-0900
- URL: <http://www.hp.com/peripherals/main.html>

## **Kitchen Sink Software, Inc./Eric Bush**

Developer of **ServerStat** HTTP logging utility.

- Voice: (614) 891-2111
- Email: [sales@kitchen-sink.com](mailto:sales@kitchen-sink.com)
- URL: <http://www.kitchen-sink.com/ss.html>



Shareware on the CD.

## **Neon Software Inc.**

Developer of the **LANsurveyor** and **OTTool** network management applications.

- Voice: (800) 334-NEON
- Email: sales@neon.com
- URL: <http://www.neon.com>



Trial software on the CD.

## **Open Door Networks, Inc.**

Developer of the **AFP Engage!** utility, **LogDoor** HTTP logging utility and **HomeDoor** multidomain management application.

- Voice: (541) 488-4127
- Email: logdoor@opendoor.com
- URL: <http://www.opendoor.com>



Trial software on the CD.

## **Qualcomm, Inc.**

Developer of the **Eudora** email client.

- Voice: (800) 236-3672
- Email: eudora-rep@eudora.com
- URL: <http://www.eudora.com>

## **RUN, Inc.**

Developer of the **RunShare** and **RunShare GSA** network acceleration systems.

- Voice: (800) 478-6929
- Email: info@runusa.com
- URL: <http://www.runshare.com>



Trial software on the CD.

## **Santorini Consulting and Design, Inc.**

Developer of the **Server Manager** and **Server Tools** server management utilities.

- Voice: (800) 851-7824
- Email: [scdsupport@aol.com](mailto:scdsupport@aol.com)
- URL: <http://www.santorinicd.com>

 Server Manager and Server Tools on the CD.

## **Scion Networks LLC**

Provider of consulting, training and publishing.

- Voice: (415) 346-9200
- Email: [info@scionnet.com](mailto:info@scionnet.com)
- URL: <http://www.scionnet.com>

 AppleShare administrator templates on the CD.

## **StarNine Technologies, Inc.**

Developer of **Mail\*Link** email gateways, **WebSTAR** HTTP server, and **ListSTAR** list server.

- Voice: (800) 525-2580
- Email: [sales@starnine.com](mailto:sales@starnine.com)
- URL: <http://www.starnine.com>

 Trial software on the CD.

## **Vicom Technology Ltd.**

Developer of the **Vicom Internet Gateway** application.

- Voice: (800) 818-4266
- Email: [sales@vicomtech.com](mailto:sales@vicomtech.com)
- URL: <http://www.vicomtech.com>

## Wave Research N.V.

Developer of the **FileWave** network management and **Asset Trustee** asset management systems.

- Voice: (888)-FILEWAVE
- Email: [sales@waveresearch.com](mailto:sales@waveresearch.com)
- URL: <http://www.waveresearch.com>



Product information on the CD.



---

*Note: All product names are trademarks or registered trademarks of their respective holders.*

---

# Index

## A

A/UX 7

About this Computer 34, 37, 52, 377

access privileges 96–97

    assigning 105–107, 227

    inherited versus explicit 443

    Make Changes 96, 175, 401

    None 97, 405

    Read & Write 97, 405

    Read Only 97, 405

    and security 107

    See Files 96, 175, 401

    See Folders 96, 175, 401

    under Mac OS 8 405–409

    under System 7 400–404

        transferring to AppleShare IP 405

    Write Only 97, 405

accounts 98

    Groups 98

        creating 133–137

        deleting 137–138

    managing 116–143

    Users 98

        Administrator 56, 106, 122, 125, 138

            name 101, 122

            password 101, 122

        creating 116–118

        deleting 137–138

        duplicating 129–132

    Guest 100, 126, 175

    Mail Administrator 126, 283

    managing 119–128

Acrobat 239

Active X 242

Adobe Type Manager (ATM) 362

AFP Engage! 88, 221

AIX 12

anonymous FTP 104, 127

Apple Classic Networking 368

Apple HD SC Setup 32, 43

Apple Internet Mail Server (AIMS) 268

Apple IP Gateway 261

Apple Network Server (ANS) 12, 37

Apple Open Collaboration Environment  
(AOCE) 268

Apple RAID 195

    installing 202–211

    mirroring 201–202

    RAID levels supported 199–200

    rebuilding 211–212

    striping 200–201

Apple Workgroup Server (AWS) 5, 13–22

    60 22

    6150 20–21, 35, 36, 37

    7250/120 17, 36, 37, 38

    7350/180 16, 34

    80 22

    8150 20, 35, 37, 38

    8550 19–20, 36, 37

## Apple Workgroup Server (cont.)

- 9150 17–19, 35, 37, 38
- 95 21
- 9650/233 15
- 9650/350 14–15, 34
- installing expansion boards 37–38
- installing RAM 34–37
- installing storage devices 38–44

## AppleScript 243, 248, 300

## AppleShare

- concepts 94–100
- introduced 1
- Pro
  - hardware requirements 7
  - limitations 7
  - software requirements 7
  - speed 7
- version 2.0.1
  - limitations 2
- version 3.0.3
  - hardware requirements 2
  - limitations 3
  - software requirements 3
- version 4.0.2
  - hardware requirements 4
  - limitations 5
  - software requirements 4
  - speed 4
- version 4.1
  - limitations 5
  - software requirements 5
  - speed 5
- version 4.2.1
  - hardware requirements 6
  - limitations 6
  - software requirements 6
  - speed 6

## AppleShare Admin 68, 150

- copy shared volumes 76–77

## AppleShare Client 375

- connecting 383–389
- installing 375–382
- version 3.7 93, 110, 378

- working with mounted volumes 391–392

## AppleShare Client for Windows 537

- accessing AFP servers 540
- accessing LaserWriters 542
- installing 538
- setting computer name 544

## AppleShare Client Setup 453–457

## AppleShare IP

- enabling multihoming 154–155
- hardware requirements 8, 22, 34
- installing 24, 52–67
- licensing 62, 158
- limitations 9
- password policy 156–157
- serial numbers 64, 158
- setting log on greeting 151–153
- software requirements 8, 52
- unmounting disks 150
- upgrading to 24, 30, 31, 54, 63, 64, 103, 117, 127

## AppleShare IP Easy Setup 72, 77

- custom setup 63
- launching 63
- normal setup 63
- start manager 66
- start servers 66

## AppleShare IP Manager

- and DNS information 276
- and easy setup 66
- open Mail Server Admin 276
- open Print Server Admin 348
- open Web & File Server Admin 101
- window 67

## AppleTalk 48, 52, 57, 80, 331

- configuring 369–370
- limitations 88
- under DOS 526–537
- under Windows 3.1 537–548
- under Windows 95 549
- under Windows NT 549
- zone 57, 369

## AppleTalk Filing Interface (AFI) 85

AppleTalk Filing Protocol (AFP) 80  
     how it works 80–88, 93–94  
     maximum volume size 5  
     over TCP 93, 109  
     tickle packets 146  
     version 2.2 93, 94  
 AppleTalk Remote Access (ARA)  
     version 2.0 393  
     version 3.0 398  
 AppleTalk Remote Access Protocol  
     (ARAP) 393  
 AppleTalk Session Protocol (ASP) 85,  
     90, 334  
 AppleTalk Transaction Protocol (ATP)  
     90, 334  
 Asynchronous Common Gateway Inter-  
     face (ACGI) 243  
 Asynchronous Transfer Mode (ATM)  
     15, 521  
 Authenticated Post Office Protocol (APOP)  
     280, 424, 426  
 AutoRemounter control panel 391

## B

background printing 338, 347  
 Base64 429  
 baseline 165  
 bill back 159, 165  
 BinHex 238, 306, 429  
 BIOS (Basic Input Output System) 523  
 BootP 370  
 Bulletin Board Service (BBS) 270

## C

categories 99  
     Any User 100  
     Everyone 100, 126, 403, 408, 441  
     Owner 100, 403, 408  
     User/Group 100, 403, 408, 441  
 Centronics port 38, 40

Chartwell Partners International 45  
 Claris Em@iler 121, 157, 268, 423  
 Claris Em@iler Lite 269  
 ClarisWorks 140  
 clean install 52  
 client-server model 79  
 ColorSync 347, 437  
 Common Gateway Interface (CGI) 213  
     and ACGI 243  
     availability of 243  
     Count WWWebula 244–247  
     how it works 242–243  
     installing 244–248  
     special considerations 247  
     using 242–248  
 Computer name 56  
 COPSTalk  
     accessing AFP servers 555  
     accessing LaserWriters 558  
     installing 550–554  
     setting computer name 560  
 creator code 530  
 custom install 62

## D

data fork 238, 530  
 Data Stream Interface (DSI) 93  
 Data Transfer Process (DTP) 91  
 Date & Time control panel 61, 281, 309  
 DeskJet 362  
 Desktop Printing 334, 435  
 Digital Audio Tape (DAT) 24  
 Direct Memory Access (DMA) 38  
 direct printing 338  
 Disk First Aid 32  
 Disk Operating System (DOS)  
     directories 526–527  
     installing software 534–535  
     moving files 535–537  
     naming conventions 527–529  
     working with files 530–533



Disk Quota 159, 162  
domain name 60  
domain name space 573  
Domain Naming Service (DNS) 218,  
219, 272  
    how it works 571–576  
    and mail hosts 275  
Doom 239  
DOS  
    8.3 convention 527  
dots per inch (dpi) 331  
Double Inline Memory Module (DIMM) 36  
Drive Setup 32, 43  
drop box 97  
Duke Nukem 239  
Dynamic Host Configuration Protocol  
    (DHCP) 370  
Dynamic Random Access Memory  
    (DRAM) 35

## E

earthquake 45  
easy install 62  
electromagnetic fields 47  
email  
    attachments 428  
    conventions 428–429  
    enclosures 428  
    encoding 429  
    history of 267–270  
    how it works 270–275  
Email-On-Demand (EOD) 300  
Energy Saver 391  
Ethernet 49, 51, 59, 521  
EtherWave 341  
Eudora 268, 423  
European Particle Physics Institute (CERN)  
    215  
Excel 140  
expectation of privacy 138

## F

Fast Ethernet 49, 51  
Fetch 92, 114  
Fiber Distributed Data Interface (FDDI)  
    15, 51  
file  
    compression 428  
    copy protection 450  
    encoding 429  
    locking 451  
File Server Report 54  
File Server Summary 55  
File Transfer Protocol (FTP) 80, 220  
    commands 93  
    how it works 88–93  
FileMaker Pro 242, 531  
FileWave  
    and user support 464–472  
fire 47  
firewall 52  
flood 45  
FolderBolt 33  
fonts 360–364  
    bitmapped 331, 361  
    PostScript 361  
    QuickDraw GX 363  
    TrueType 362  
    usage tips 364  
FreePPP 398

## G

Gopher 214, 220  
Graphic Interchange Format (GIF) 231  
Graphical User Interface (GUI) 93, 214  
GraphicConverter 231  
Greenwich Mean Time (GMT) 60, 309  
grounding strap 36, 37

**H**

- hard disk
  - backing up 24, 67
  - “hot swappable” 12
  - mirroring 199
  - striping 199
- headless server 47
- Hierarchical File Structure (HFS) 229
  - maximum number of files 5
- HomeDoor 88, 253–261
- HomePage 230, 236, 420
- host name 218, 571
- HyperText Markup Language (HTML) 213
  - creating a home page 230–236
- HyperText Transfer Protocol (HTTP)
  - 80, 214
  - commands 218, 254
  - how it works 216–220
  - redirection 254
  - version 1.0 216, 257
  - version 1.1 257

**I**

- ImageWriter 331, 362
- Industry Standard Architecture (ISA) 525
- International Standards Organization (ISO) 80
- Internet 58, 59, 127
- Internet alias 117, 129, 132, 140, 278
- Internet Config 424
- Internet Control Message Protocol (ICMP) 255
- Internet Explorer 423, 565
- Internet Service Provider (ISP) 58, 59, 255, 275
- internetwork 49
- InterNIC 58
- Intranet 58, 68
- IP address 58, 59, 218, 571
- IPX/SPX 521
- iteration 575

**J**

- Java 242
- JavaScript 242

**K**

- Kensington 46

**L**

- LANsurveyor
  - and server placement 50
  - and user support 459–462
- LaserJet 430
- LaserWriter 40, 332, 430
- ListSTAR 270, 300–330
- LocalTalk 50, 51, 59, 88, 521
- Location Manager 399
- LogDoor 88, 261–263

**M**

- MacBinary 238
- MacDNS 64, 68, 255, 276, 572
  - caching 603–604
  - and load-balancing 589
  - looking up hosts 596
  - monitoring 597–602
  - setting up 576–588
  - testing 592
- MacHTTP 216
- MacIP 370
- MacLink Plus 531
- MacPPP 398
- MacSLIP 398
- MacTCP 90, 261, 368, 576
- Mad Dog 43
- Mail Server
  - and AppleTalk 285
  - connecting over AppleTalk 427
  - connecting over TCP/IP 424
  - email forwarding 284–285

**Mail Server (cont.)**

- email routing 288–290
- enabling user access 278–280
- establishing Mail Services 275–280
- group mailing 290
- importing/exporting accounts 288
- increasing client connections 291
- launching 276
- log 295–299
  - error log 298
  - server log 296
- mail database 280, 282
  - and hard disk space 283
  - backing up 299
- message status 293
- outgoing email 292–295
- outgoing email window 292
- retries 294
- stop delivery 295

**Mail Server Admin**

- activity window 277
- parts of 280–282

Mail\*Link SMTP 267

Mail\*Link UUCP 267

MailShare 268

Map control panel 60

Marathon 239

Message Transfer Agent (MTA) 270

Message Transfer System (MTS) 270

Micro Channel Architecture (MCA) 525

milestone backup 24, 67, 180

Mosaic 216

MS Mail 267

multihoming 6, 51, 58, 145, 154, 389

Multipurpose Internet Mail Extensions  
(MIME) 214, 269

- suffix 238
- type mapping 237
- using 237–241

**N**

Name Binding Protocol (NBP) 85, 334

name server 60, 573

National Center for Supercomputing  
Applications (NCSA) 216

netOctopus

and user support 462–464

Netscape Navigator 216, 423, 565

NetWare 11, 48, 522

AppleTalk NetWare Loadable Module  
(NLM) 522

Network Interface Card (NIC) 14

network segment 49, 57

Network Software Selector 369

nibblers 176

Norton Utilities 32

Notify! 160

NuBus 37, 52

**O**

Open Data-link Interface (ODI) 525

Open Systems Interconnection (OSI) 80

Open Transport 8, 52, 53, 68, 261, 298,  
377, 576

configuring 368–374

Open Transport/PPP 396

OpenDoc 8, 160

OSI reference model

AppleShare in 86

AppleTalk in 82

printing in 335

TCP/IP in 88

OTTool 592–596

Owner password 56

**P**

Parallel Directory Structure (PDS) 30

Parameter RAM (PRAM) 334

password 117, 121, 156, 175

## PC

- compared to Macintosh 523–526

- file sharing with Macintosh 521–522

- working with DOS 526–537

- working with Windows 3.1 537–548

- working with Windows 95 and NT 549–570

PC Card 525

PC Exchange 531

peer-to-peer model 79

Peripheral Component Interconnect (PCI)  
15, 37, 52, 58, 525

Personal Computer Memory Card International Association (PCMCIA) 525

Personal File Sharing 30, 51, 54, 55, 79, 94,  
103, 117, 160, 174, 341, 410–418

- limitations 410

- speed 80

Personal LogDoor 422

Personal Web Sharing 418–423

PhoneNET PC 526, 535

Photoshop 134

pipeline 219

Point-to-Point Protocol (PPP) 396

Post Office Protocol (POP) 268, 423

Postmaster 126, 284, 316

PostScript 332, 334

PostScript Printer Description (PPD)  
347, 431

power 46

PowerShare 268

PowerTalk 160, 268

print queue 338

## Print Server

- activity window, parts of 356–357

- attaching printers 351–354

- automatic startup 355

- creating queues 350–351

- detaching printers 353

- installing 348–355

- launching 349

- limitations 348

- log 359

- managing 356–360

- managing queues 356–359

- queue monitor window  
parts of 357–359

## Print Server Admin

- activity window 349

- launching 348

print spool 338

## printer

- and Chooser visibility 353

- connecting to network 341

- driver 333, 430

- naming 342

- setting zone 343

- sharing on network 341–347

- and speed 344

Printer Access Protocol (PAP) 334

Printer Control Language (PCL) 332

## printing

- history of 331–332

- how it works 333–340

- over a network 430–436

privacy 138

Processor Direct Slot (PDS) 37

PROFS 270

program linking 123

Protocol Interpreter (PI) 91

## Q

Quarterdeck Mail 267

QuickDraw 331, 334, 361

QuickMail 160, 267

QuickTime 239

## R

rainy day hard drive 31, 42

RAM cache 4, 111, 162, 196  
RAM Doubler 32  
rasterizing 332  
recursion 575  
Redundant Array of Independent  
Computers (RAIC) 256, 589  
Redundant Array of Independent Disks  
(RAID) 199  
registered users 116, 126  
Remote Address Resolution Protocol  
(RARP) 370  
ResEdit 239  
resolver 573  
resource fork 238, 530  
Retrospect 32, 34, 56, 68, 112, 159  
    catalog 26, 29  
    Client 193  
        for Windows 95 and NT 567  
    and DAT 24, 25, 29  
    encryption 47, 186  
    full backup 180  
    immediate backup 24, 28  
    normal backup 180  
    RAM allocations 193  
    remote backup 192–193  
    restoring 68–76  
    rotational backup 180–192  
    SnapShot 70  
    StorageSet 26  
    and user support 472–476  
    verification 187  
round-robin 589  
router 49, 51, 58, 60  
    hop 49  
RunShare 195  
    and Apple Workgroup Server 609  
    Graphic Server Accelerator (GSA) 609  
    how it works 607–609  
    and Personal File Sharing 609  
    working with 609–610

## S

screen capture 54  
SCSIProbe 41  
security 46, 54, 102, 120, 122, 126, 127, 132,  
    156, 174, 181, 227  
Server Manager 32, 34, 48, 112, 143, 159, 288  
    alarms 489–496  
    installing 479–482  
    and management tasks 511–518  
    monitor and control 496–503  
    monitored categories 485–488  
    Servers window 483–485  
    working with users and groups  
        503–510  
server rack 45  
server room 23, 45–48  
Server Tools 32, 34, 107, 159  
    Cache Register 161  
    CrashGuard 161  
        recovering from crashes 179  
    Disk Accountant 161  
        measuring hard disk usage  
            162–166  
    Disk Audit 161  
        auditing hard disk usage 168–170  
    Disk Cleaner 161  
        removing useless files 166–168  
    Disk Inspector 161  
        verifying access privileges 171–172  
    LoopHole 161  
        scanning for guest access 174–175  
    Password Watcher 161  
        spotting failed log on attempts  
            175–178  
    Reboot Agent 161  
    Server Tracker  
        creating an audit trail 178  
    Space Probe 161  
        monitoring hard disk usage  
            170–171

Server Tools (cont.)  
 Toolbox 160  
 ViewPoint 161  
     verifying access privileges 173–174

## servers

- building your own 22
- described 11–13
- how Web servers work 213–214
- installing 23, 24, 33, 52
- network placement 48–52

ServerStat 251

ServerTracker 159, 162

Session Listening Socket (SLS) 85, 336

share points 95, 105, 107

- accessing 440
- aliases 389
- creating 104–108, 225–227
- forcing enclosed privileges 447
- inherited versus explicit privileges 443
- locking 449
- managing 437–452
- naming 438
- unsharing 449
- within share points 441

shared items 95

shared volumes 95

Simple Mail Transfer Protocol (SMTP)  
 267, 423

- commands 273

SimpleText 32, 54, 231

Single Inline Memory Module (SIMM) 35

Small Computer System Interface (SCSI)  
 15, 38

- cable extender 42
- chain 38, 39, 42, 76
- driver 43
- ID 39, 41, 42
- peripheral interface cable 42
- system cable 42
- terminator 39

Small Office Home Office (SOHO) 13

Speed Doubler 32

Startup Disk 42, 68, 77, 205, 211

StuffIt 237, 238, 306, 428

StyleWriter 362, 430

subnet mask 59

suffix mapping 530

## T

Telnet 220

temperature 46

Terminate and Stay Resident (TSR) 524

Thread Manager 576

Timbuktu Pro 47

- under Windows 95 and NT 568

Time to Live (TTL) 579

Token Ring 15, 521

Transmission Control Protocol/Internet  
 Protocol (TCP/IP) 52, 88, 219  
     configuring 370–374  
     ping 255

## U

UltraShield 33

Uninterruptible Power Supply (UPS) 46

Universal Resource Identifier (URI) 217

Universal Resource Locator (URL) 217,  
 250, 255

- and AFP 220

universal system 31

UNIX 7, 12, 92

UNIX-to-UNIX Copy Protocol (UUCP) 267

User Agent (UA) 270

User Authentication Method (UAM) 85

## users

- disconnecting 146–148

- idle 146

- log off before backup 25, 189

- support tips 457–458

Users & Groups Data File 53, 269, 278  
    backing up 30, 71, 139  
    importing/exporting 139–143  
    restoring 72, 77  
    synchronizing 286  
UUencode 306, 429

## V

virtual circuit 90  
Virtual Memory 34

## W

war dialing 157  
Web & File Server  
    activity window 223  
        anonymous FTP/guest access 128  
        parts of 143–145  
    adjusting client connections 197  
    anonymous log on 114, 127  
    automatic startup 110  
    connected users window 146  
    directory listing 221  
    enabling file services 113–115  
    enabling Web services 112–113, 228  
    establishing file services 101–115  
    establishing Web services 222–229  
    guest access 115, 126, 174  
    HTTP log 249–252, 261  
    and keep-alive 219  
    launching 103, 223, 224  
    limiting concurrent program use 452  
    maximum HTTP connections 229  
    monitoring usage 143–146  
    open Web & File Server Admin 223  
    optimizing caching 196  
    optimizing processor usage 195  
    and persistent connections 219  
    server info window 145, 225  
    settings window  
        parts of 228–229

    and short names 529  
    shutting down services 148  
    testing 115  
Web & File Server Admin  
    activity window  
        opening 102  
    connected users window 103  
    enabling AFP/TCP 109  
    launching 101  
    server info window 103  
    show disks and share points 104  
    Users & Groups list  
        opening 116  
Web browser 58, 148, 213, 219, 220, 235, 237  
    accessing AFP URLs 220  
Web Folder 113, 126, 225, 229, 244  
    Default.html 235  
    installing 63  
    sharing 104  
Web log 229, 249  
WebSTAR 179, 216, 244  
Windows 3.1 537  
    moving files 544–548  
Windows 95 and NT 549  
    and Timbuktu Pro 568  
    configuring TCP/IP 563–565  
    moving files 561–562  
    using backup services 567  
    using email services 566  
    using Web services 565  
Windows NT Server 12, 522  
World Wide Web (WWW) 58, 214  
    history of 214–216

## X

Xanadu 215

## Z

zone 432  
Zone of Authority (ZOA) 576





## LIMITED WARRANTY AND DISCLAIMER OF LIABILITY

ACADEMIC PRESS ("AP") AND ANYONE ELSE WHO HAS BEEN INVOLVED IN THE CREATION OR PRODUCTION OF THE ACCOMPANYING CODE ("THE PRODUCT") CANNOT AND DO NOT WARRANT THE PERFORMANCE OR RESULTS THAT MAY BE OBTAINED BY USING THE PRODUCT. THE PRODUCT IS SOLD "AS IS" WITHOUT WARRANTY OF ANY KIND (EXCEPT AS HEREAFTER DESCRIBED), EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF PERFORMANCE OR ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. AP WARRANTS ONLY THAT THE MAGNETIC DISKETTE(S) ON WHICH THE CODE IS RECORDED IS FREE FROM DEFECTS IN MATERIAL AND FAULTY WORKMANSHIP UNDER THE NORMAL USE AND SERVICE FOR A PERIOD OF NINETY (90) DAYS FROM THE DATE THE PRODUCT IS DELIVERED. THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY IN THE EVENT OF A DEFECT IS EXPRESSLY LIMITED TO EITHER REPLACEMENT OF THE DISKETTE(S) OR REFUND OF THE PURCHASE PRICE, AT AP'S SOLE DISCRETION.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT, WARRANTY OR TORT (INCLUDING NEGLIGENCE), WILL AP OR ANYONE WHO HAS BEEN INVOLVED IN THE CREATION OR PRODUCTION OF THE PRODUCT BE LIABLE TO PURCHASER FOR ANY DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT OR ANY MODIFICATIONS THEREOF, OR DUE TO THE CONTENTS OF THE CODE, EVEN IF AP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY.

Any request for replacement of a defective diskette must be postage prepaid and must be accompanied by the original defective diskette, your mailing address and telephone number, and proof of date of purchase and purchase price. Send such requests, stating the nature of the problem, to Academic Press Customer Service, 6277 Sea Harbor Drive, Orlando, FL 32887, 1-800-321-5068. APP shall have no obligation to refund the purchase price or to replace a diskette based on claims of defects in the nature or operation of the Product.

Some states do not allow limitation on how long an implied warranty lasts, nor exclusions or limitations of incidental or consequential damage, so the above limitations and exclusions may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

THE RE-EXPORT OF UNITED STATES ORIGIN SOFTWARE IS SUBJECT TO THE UNITED STATES LAWS UNDER THE EXPORT ADMINISTRATION ACT OF 1969 AS AMENDED. ANY FURTHER SALE OF THE PRODUCT SHALL BE IN COMPLIANCE WITH THE UNITED STATES DEPARTMENT OF COMMERCE ADMINISTRATION REGULATIONS. COMPLIANCE WITH SUCH REGULATIONS IS YOUR RESPONSIBILITY AND NOT THE RESPONSIBILITY OF AP.



# AppleShare IP

Tom Dell

## Level

Intermediate to Advanced

This book includes a CD-ROM that runs on Mac OS 8 and contains useful utilities and product demos.

## About the Author








Raised and educated in Minnesota, Tom Dell ran newspapers and prepress networks before leaving the cold for Silicon Valley in the late 1980s. Although he misses Minnesota, he thinks walking to the office in his shirt-sleeves in December is a more pleasant way to prepare for a day's work than scraping a windshield at -40°. Dell is President of Scion Networks LLC in San Francisco, as well as a nationally known consultant, trainer, and author.

## A Fresh Approach to AppleShare

With the introduction of AppleShare IP 5.0 in the summer of 1997, Apple radically retooled its original AppleShare product aimed at small Macintosh workgroups. Now designed with world-reaching capabilities, the release includes a file server, Web server, print server, email server, and DNS server, all based on the non-proprietary language of the Internet TCP/IP. This greatly extends the product's potential within the enterprise as it can now support PCs and UNIX computers natively. However, the huge leap in functionality means that AppleShare IP 5.0 has become more complicated, presenting a management challenge to even seasoned Macintosh administrators.

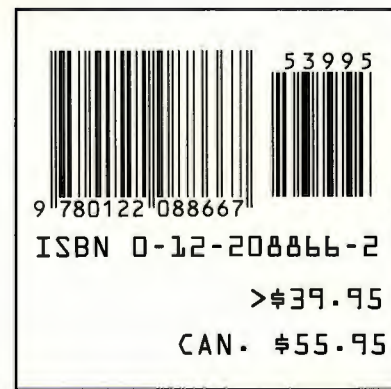
## What This Book Can Do for You

*AppleShare IP* is designed to give Macintosh administrators all the information needed to properly deploy and manage AppleShare IP, Macintosh servers, and AppleShare IP clients. It teaches readers how to:

-  Deploy AppleShare IP's file, Web, email, print, and DNS servers properly
-  Optimize AppleShare IP and the Apple Workgroup Server performance
-  Work with protocols such as AFP, FTP, HTTP, SMTP, PAP, and TCP
-  Create strategies for supporting end users on both Mac OS computers and PCs
-  Migrate from System 7 to Mac OS 8 access privilege schemes
-  Improve server security with Dantz's Retrospect and Santorini's Server Manager/Server Tools
-  Add functionality and improve performance with Open Door Network's HomeDoor and LogDoor, StarNine's ListSTAR, and RUN, Inc.'s RunShare

CD-ROM  
ENCLOSED

UPC



EAN